Vol. 4 JUNE, 1922 No. 3

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry.

U. S. Department of Agriculture

The Greatest Good To The Greatest Number

In this industry will be accomplished by the distribution of copies of the 1923 edition of the Paper and Pulp Mill Catalogue. This big book will be wonderfully helpful to every buying and suggesting power in every Paper and Pulp Mill in the United States and Canada, as well as many in foreign countries, and it will not cost them one cent.

Already we have had requests for a great number, and these come not only from this country and Canada, but from Cuba, the Pacific Isles, European countries, etc., and we again wish to inform all those interested that the book will not be sent out until late this year, but that all requests will be held and filled as soon as possible.

Manufacturers of machinery, and dealers in supplies of all kinds should see that a full and complete list of everything they have to sell to the paper or pulp mills is sent to us immediately. They should also see to it that their catalogue pages are incorporated in it. This is the greatest opportunity that they have ever had to keep their circulars, pamphlets, catalogues, etc., always in front of the suggesting and buying powers of all of the mills.

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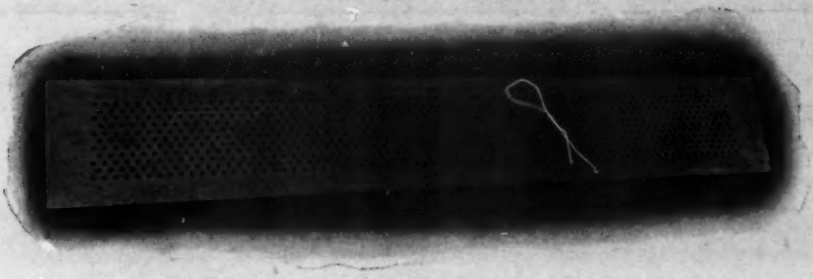

To the Paper Mill Manager

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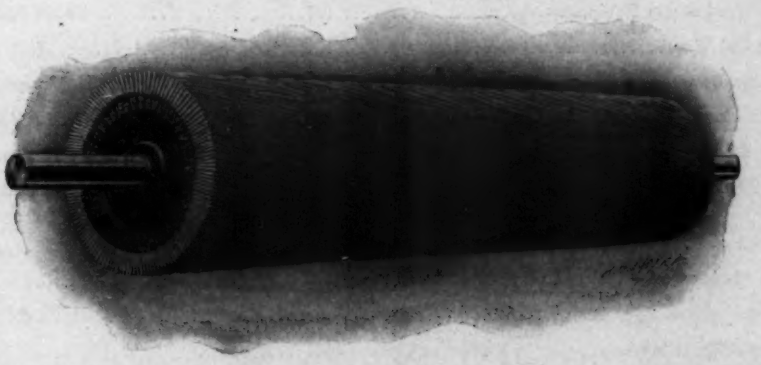

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Vol. 4—No. 3

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

CONTENTS

FOR JUNE, 1922

Editorials ..... 347, 351 and 355
The Foreman of Today ..... *H. M. Grasselt* 373
Power Plant Management ..... *Robert June, M.E.* 375
Safeguarding the Worker in the Machine Room ..... *Raymond A. Steffin* 379
Pointers for the Engineer ..... *W. F. Schaphorst, M.E.* 382
Six Definite Things that Workers Want ..... *James H. Collins* 386
The Electric Steam Generator ..... *Horace Drever and Frank Hodson* 388
Joint Convention of the American Pulp and Paper Mill Superintendents Association with the Cost Association of the Paper Industry 395
An Executive's Viewpoint on Subject of Co-operation Between Superintendents and Cost Departments ..... *George A. Galliver* 403
Reclaiming Waste Heat in a Machine Room ..... *J. O. Ross* 405
Handling Wood Room Equipment ..... *Frank J. Carroll* 409
The Electrical Way ..... *S. A. Staege* 411
Co-operation Between Superintendents and Cost Accountants ..... *Joseph Slater* 415
Mill Costs from a Technical Man's Standpoint ..... *W. G. MacNaughton* 419
Notes on the Production of Half-Stuff from Waste Papers ..... *E. G. Milham, Chem. Engr.* 421
How the Superintendents Are Benefited by Cost Reports Based on Accurate Manufacturing Data ..... *James A. Reilly* 427
Commercial Outlook 459
Domestic Markets 461
Current Quotations 467
Import and Export Markets 469
Buyers' Guide 475-479
Index to Advertisers 481

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Paper Is a Purchase Now

THE evidence of a returned prosperity in this country is overwhelming. Every newspaper, every trade journal, every banking and industrial report—all testify indubitably to the above fact.

There is nothing the matter with the business of the United States; never was it sounder, stronger, more inherently prosperous than now. The outlook is for continued months of increasing volume of business at a profit.

However, there is one big fly in the ointment pot—the coal strike. The indifference of the general public to the consequences of this strike are nothing short of appalling. Unless something is done and done quickly to settle the strike, the situation will develop into a commercial tragedy.

Reserve stocks of coal are slowly but surely diminishing; between now and the first of August an acute crisis will develop. The union mines are closed; the only coal being mined is by non-union miners south of the Ohio River. The great Central West and Northwest cannot economically purchase that coal on any price basis of economic production. The reserve of coal at the lake ports are being used for current consumption by the railroads and industries, and it is reported by good authority that coal from the Lake Superior ports is being shipped east for consumption there.

For ten weeks the union coal miners have been out on strike, and from no part of the union coal fields has there come any demand for a settlement of the strike. Evidently the plan is to have no conferences aiming to settle the strike until the approach of cold weather. The miners are taking a vacation, or working on the farms or various industries in their parts of the country. They are biding their time in patience until a shortage of coal for both industrial and domestic use arises, and that crisis will appear sometime between now and August first.

In the Northwest the first frosts usually appear about August 13th. If a settlement of the strike is put off until the beginning of August or the latter part of July it will be well nigh impossible to stock the West and Northwest with the winter's coal supply. There has already been an advance in the price of all grades of coal to the consumer. Industrial consumers are already beginning to bid for supplies; some grades of coal in the West are unprocurable at any price today.

What is going to happen?

The leaders of the United Mine Workers of America evidently are good psychologists; they are relying on the continued indifference of the public to the coal situation until cold weather approaches, when the whole West and Northwest will awaken and demand coal.

They will send bushels of telegrams to their congressmen and senators to the effect, "We want coal!" The miners expect Government interference, when they will be able to dictate an advanced wage scale as the price of their return, and keeping the public from freezing to death and the industries from a total shut-down.

The situation in a nutshell is this: wide awake, organized labor against an unorganized, indifferent public. At this writing every factor in the equation favors the winning of the battle by the United Mine Workers of America.

It doesn't take much of an imagination to picture the commercial and industrial situation into which we are drifting.

We must have fuel and power for the production of commodities.

There will be a big demand for fabricated commodities this fall. With the shortage of coal, commodity production will be diminished, and with a concurrent demand for domestic coal for the West and Northwest, transportation of commodities will become a secondary consideration. Those merchants who neglect to acquire their supplies of fabricated commodities, will find themselves unable to procure them for anything like current quotations, or if they are able to buy them, unable to get anything like normal transportation facilities.

In 1919 congested transportation and the delay in delivery of commodities from factory to merchant and from merchant to consumer contributed in great degree to the inflation of commodity prices. A similar condition, only more intensified in the case of the coal strike, confronts us today.

In the opinion of THE PAPER INDUSTRY it is a matter of paramount importance that every merchant and manufacturer should secure at once his stock of coal and fabricated commodities. It would be a miracle if, with two months of hot weather ahead of us, any particular influence could be brought to bear on the public of sufficient strength to bring about a settlement of the coal strike before disastrous results overtake us. If anything is to be done to avert a crisis it should be done now. Nothing that we can see is being done at the present writing.

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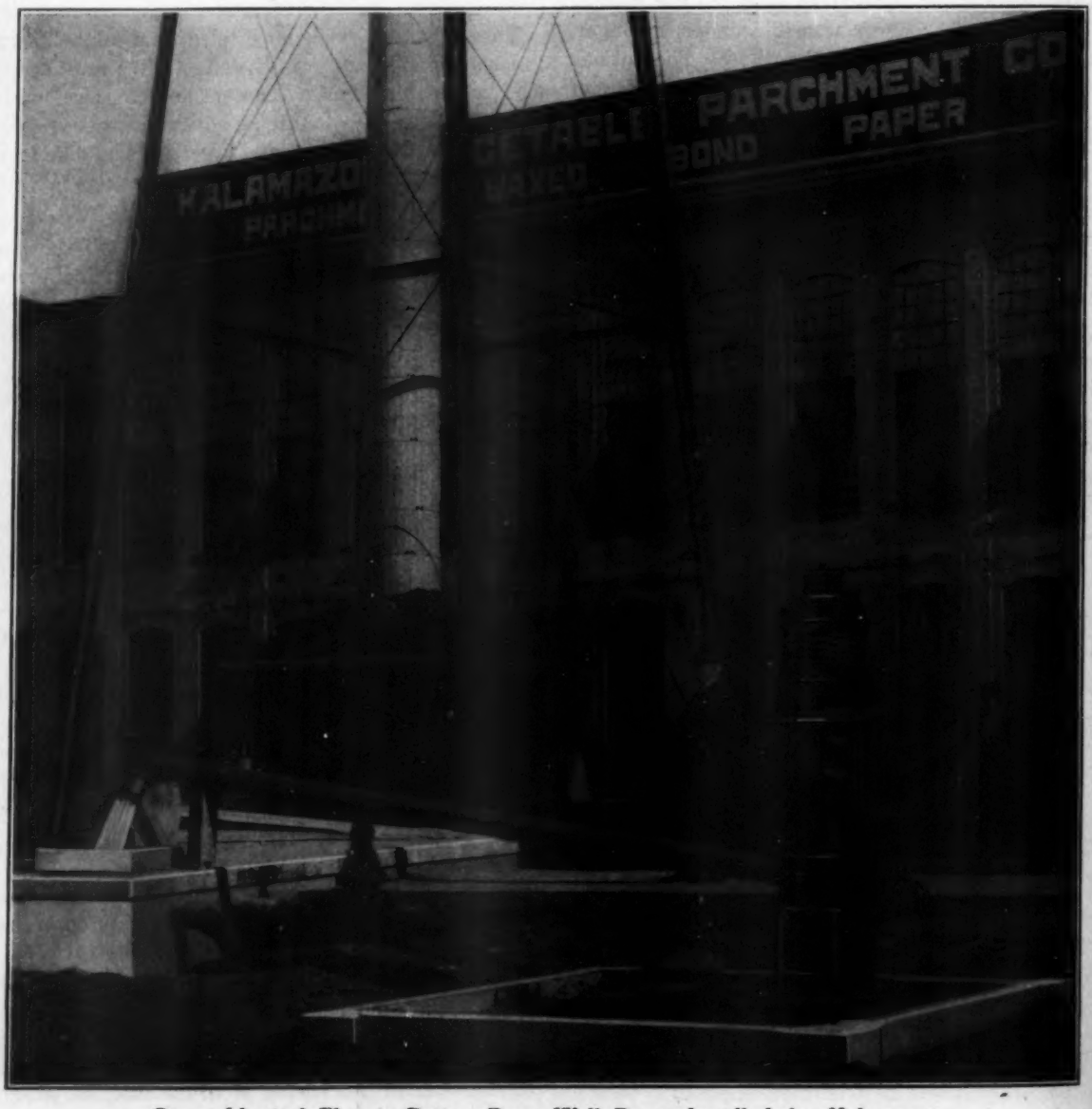

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Jacob Kindleberger's Welcome

Delivered before the first joint session of the American Pulp and Paper Mill Superintendents' Association and the Cost Accountants of the Paper Industry, at the Kalamazoo Vegetable Parchment Company's Community House, Kalamazoo, Michigan, June 1, 1922.

MR. PRESIDENT, men: Our little community down here, and the citizens of Kalamazoo, and everybody in Kalamazoo are just bubbling over with gladness to see you here today. We have been expecting you for a long while and looking forward to this date with a great deal of pleasure, so we are glad to see you here. And while you are here we want you to know that you can have any old thing you want. Make yourselves at home. We haven't any upper rooms here, by the way, where you can go and taste the samples.

You know, men, this is the thought that comes to me when I see you sitting together and talking over your lines of work; this is the vision that comes to me: It is the light in the East that tells us there is the dawning of a new day upon this old earth, when men everywhere will sit down and forget all their little prejudices and look one another in the face and call each other by their first names and be real honest-to-goodness human beings, trying to help one another over the difficult places. That is the dawning of a new day, and never before in the history of this world has that occurred as much as this particular time, not only in our industry, but it is so everywhere, in every avenue of life and any one living today should shake hands with himself that he is living in the choicest age of all the world.

As I look into your faces, I am reminded of the fact that there has been a tremendous advance made by paper makers in the past twenty-five years. When I was a boy only ten years old, I started in the paper business. Thirty-seven years ago—I don't look it either, do I? But during those days a paper maker who could not chew five cents worth of tobacco at one time, wear a breezy shirt and drink whiskey and spin a lot of tales was not a real paper maker. You don't hear that so much today; you don't see that so much today. Paper makers have been raised to a wonderfully high plane and I am mighty glad to see it. Now there are just two little things I want to speak to you about and then I am going to sit down.

I hope you are going to get so many good things to take home and mull over that your railroad fare and your hotel bill will be mighty small in comparison to what vou take away from the meeting.

I think the fact that the Cost Accountants are meeting with the Superintendents is the finest thing that could possibly have been thought of because the Cost Man in an industry isn't worth a thing to an institution unless he gets the co-operation of the Superintendent and of the Foreman and everybody else.

I said to the Cost men here this morning, "Men, do you know what I would do if I were you? I would go back on that job of mine, and believe me, I would look the Superintendent, the Foreman, and the President of the company right straight in the eye-ball and I would say, 'I have got to make good in this job, and if I do you must co-operate with me and the paper mill will never know its real cost until you help and wake up to the situation that a cost system amounts to nothing unless everybody joins hands.' When that time comes when everybody in your institution melts their hammers into plowshares and their knives into pruning hooks, they will learn the greatest lesson that mortal man has got to learn, that to co-operate with others means greatness."

You are not worth a nickel to any institution unless you can co-operate with other men. I should say that is the foundation of your success.

Another thing: to know mankind, to know human nature, is another wonderful cornerstone, and it is a cornerstone that a great many builders have been rejecting. Nevertheless it comes at the head of the list.

With all your fine efficiency in a paper mill, unless you have a crew of men that are true and loyal and with you every minute, you will not make a success. So the great thing before you today is to learn to know how to handle the men.

That is one reason this Community House has been built. It functions in four ways. We take care of folks spiritually, mentally, socially and physically.

You will be forgotten in a few days after you are put under the sod, but if you will try to make men as you go along, I tell you, your memory will be kept green for ever after and if you do that you are helping yourself, the institution and industry. I wish I had time to elaborate on these for that is my hobby —making men.

I stand here today because I worked for a man that took me by the back of the neck and gave me a good swift kick, and it was a mighty good thing, but we don't believe in making men that way today. There is another way of making them. It is a mighty fine thing when men will get interested in others and teach them a line of business and the fundamentals of running a business, and that ninety per cent of it is outside of the machine room and the beater room. That is one of the things that the superintendents of the days gone by have neglected to do.

I hope you will all begin to think of this and as time goes on every one of us in the paper industry can look with a great deal of pride on all those that are with us a mighty high grade of men.

We welcome you. Stay as long as you want to. You have the keys to our mill, I am sure of that, and as has already been said, we hope this will not be the last time you will come to Kalamazoo. We are not as big as Buffalo, or New York, or Chicago, but listen! There is one thing and that is that they will not be able to beat us in our good feeling and gladness in welcoming you here. God bless you all.

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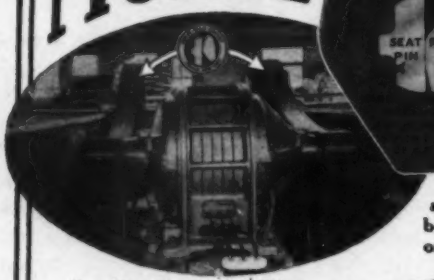
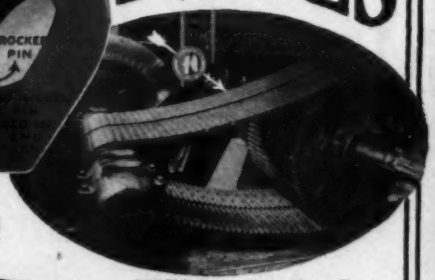
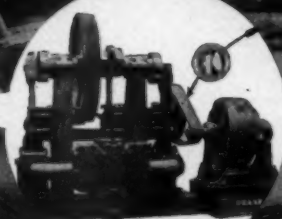


Two Silent Chain 80 H.P. Drives



300 H.P. Drive From Motor To Beater Line Shaft



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A Superintendent's "Dope" on Waste

By MICHAEL LUDWIG, Jr.
Superintendent, Mead Pulp & Paper Company
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THERE is one thing in connection with the operation of this mill in which I am vitally interested, and which gives me more cause for worry than any other one thing. That one thing is the matter of waste; particularly in the paper-making end of the plant, and more generally speaking in all departments of the mill.

Do you men know that the more "broke" you make the more money the company is losing, and the more money you, individually, are losing in the end? For instance, we will say that five per cent of the paper made on the machines is wasted and lost through "broke." That means that your production has been cut down just five per cent, with the consequent result that the old paper plant and the pulp mill are necessarily held back in their production. We have the men there to do their share of the work of this plant and if you men on the paper machines do not take their output you are holding them back and we are paying those men for work which they cannot do —for sitting around—whereas if you would pay more strict attention to your work and avoid some of the waste we would make more paper and use more old papers and pulp, from both our old paper plant and from our pulp mill.

I will give you a little illustration on how to cut down on waste. Take the boiler room first. Keep your steam regular and we will not have any variations of speed on the paper machine which always cause breaks and a consequent loss through "broken" paper. Second, see that the engineers keep their steam engines and turbines well oiled and that a constant supply of water is supplied through the pumps to all departments of the mill. This will greatly assist us in cutting down our waste.

Third: Beater engineers, see that your helpers do not put dirty stock and dirty shavings into the beaters. Make sure that they put the right amount of soda pulp in the beaters and see that they put in the proper amount of old paper stock, as well as the proper amount of sulphite. See that they do not open the old paper valve and leave valve out of the beater open at the same time, thus giving a double dose of old papers to the beater. Also make sure that they get the same amount of alum and size in each beater, and that each beater when dropped has an equal amount of paper. All of these things are very important in the matter of preventing waste.

Another thing: Those in charge of the old paper plant should see that those working there get all of the rags and print out of the stock. The old papers should be defibered so that so much dirt does not show. Wash the stock right and bleach it right, because if it is not in the proper condition and is put over the machines dirty, it means that we cannot ship the paper and that the time consumed in making it has been wasted. The paper is wasted as well and has to be thrown back into the beaters and made over.

Machine men, see that your help is on the job all the time. Keep the machines well oiled and see that they are kept clean. See that the floors are kept clean also, and make sure that all old shoes, oily rags, pieces of dryer felt, etc., are kept off the floor, in order that they may not get mixed up with broken and cause endless trouble later on. Watch your reels and winders and make sure that the paper goes to the calenders in first-class shape. By so doing you will help to cut down the waste a great deal more than you may think, on first thought.

Calender men, watch your rolls when running them through the calender, and if a roll of paper does not come up even all the way across, do not run it that way all day, or all night, and then throw the paper away; but instead stop running the paper through until you have worked on your calender and know that it is doing the work properly. If you do not know what to do send for Ben Dickerson. He will tell you what to do. By following these instructions calender men can very materially cut down the waste in this department and increase the production proportionately. When your stack is running keep your helper back of the stack and you stay at the lever, and you will soon find out that you will not have any further trouble.

Winder men, keep your helpers back of the winder and you stay at the front of the winder, and if anything gets into the roll stop the winder at once and tear out the bad paper. Do not let the roll run up full size and then send it up the room to be rewound. You are gaining nothing in the end by doing so, and are really hurting yourself and the company. You are wasting your time and labor, as well as the paper, and you are losing the company a lot of money by doing so.

Now, men of the Mead Pulp & Paper Co., I am giving you these few instructions to show you how we can prevent waste and save money for the company as well as ourselves, by paying a little more attention to the little things—the details as it were. By watching the little things and by trying to prevent waste, we can make our individual jobs more secure and win recognition and promotion from the company the sooner. It is much easier to do a job right than it is to do it wrong, and in the long run it pays ten times more to do it right, in the beginning, instead of having to do it over again.

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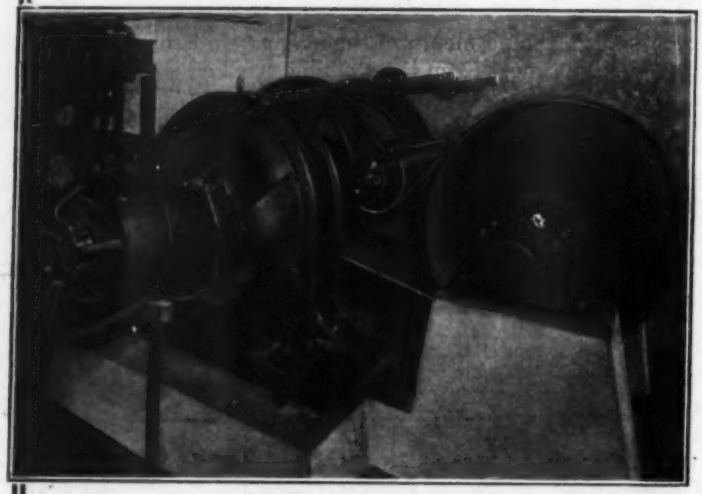

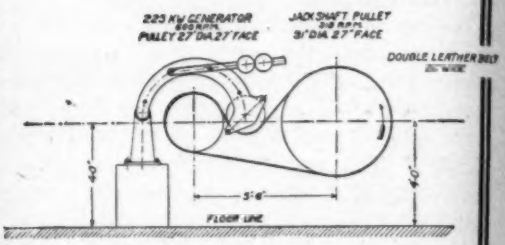

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The Foreman of Today

By H. M. GRASSELT

ONE of the most significant signs of the present period of industrial readjustment and stabilization is the evolution of a new type of foreman. The "boss" is disappearing fast or adjusting himself to the new order of things—an order built upon superior knowledge, team work and co-operation and not coercion, like in days not so long gone by.

Competition is extremely keen in the paper industry and profits are comparatively small. Raw materials are bought in the open market and labor is paid on a wage scale that is very uniform throughout the entire trade. Therefore, to keep the plant running full time, the management must endeavor to effect the lower cost in the manufacture; that is, it must produce more and a better quality than the competitor. Another factor to be reckoned with is the revival of intensive foreign competition in our domestic and export markets. Cheap labor and low costs of production enable the foreign manufacturer to quote low prices. Even if the wages of our industrial workers were to be gradually reduced to prewar standards, they would, by no means, reach so low a level as those paid in some foreign countries. To establish equalization of selling prices and thus retain our markets, we must increase our production and introduce efficiency and the best methods available into our plants and organizations. We must educate our help to clearly understand the meaning of co-operation and team work in order to obtain maximum production. The men who co-ordinate labor and machinery to materialize our efforts are the foremen.

Foremen

The success of a concern today rests more than ever upon the loyalty and ability of the foremen. They form the link between management and employees, and their aptitude reflects, to a certain extent, the policy and progressiveness of the concern.

In the paper industry and allied trades, foremen are promoted, as a rule, from the ranks. Very seldom the management hires an outsider to fill a vacancy. Promotion from the inside means better team work and brings home to each man the opportunities before him. It creates a certain "Esprit de Corps" within the force, as every man is made to realize that ability and faithful execution of duties will be rewarded in due time. Ordinarily, the man with marked native ability, energy and a thorough knowledge of his line of work receives the promotion.

However, to successfully fill his position, the foreman must be more than a proficient workman and driver. The time has passed when the ability to drive men was sufficient to hold a foreman's job. The present time requires men who understand the elements of economics and management, men who clearly comprehend the responsibilities of leadership and are able to increase production qualitatively and quantitatively at minimum cost. They must clearly realize that efficient operations and highest production at low cost are directly effected by their skill in handling help and affairs in their departments.

To help the foreman reach a higher standard and follow the progress of time, large plants are conducting "Foreman Training Courses" or hold regular meetings where problems are discussed, experience related and ways and means sought to improve conditions. Numerous books on "Factory Management" and the like have been published, and trade journals afford splendid means of gaining new ideas and information on how the other fellow does his work. The foreman, who is in a small plant far out in the country, where the holding of courses is an impossibility, should at least read one of our trade magazines and acquire a few books on modern factory management, handling of help and so forth. He even may take a correspondence school course in order to familiarize himself with the fundamentals of industry and organization and to learn to master the principles of standardization, specialization and elimination of waste.

Discharge of Duties

Planning, that is, to lay out the entire sequence of operations previous to starting work, to be able to follow up and control it in all of its phases, is absolutely necessary. It eliminates waste of time and enables the company to keep promises. Promises about delivery of goods are just as important to any business man as quality and prices.

The foreman should follow a schedule and plan his work ahead for at least one week. To plan ahead means to supply each man with work, so that all operations may be carried out without interruption and loss of time. Time lost is money wasted and an addition to the cost of the product. It also undermines the discipline of the force; employees are quick in detecting their superior's shortcomings and act oftentimes accordingly.

Planning also embraces material control. Where the foreman is responsible for the ordering of raw materials, he must order them in time, so that no delay in the working order occurs. He should remember, however, that excessively large stocks and a consequent slow turn-over of materials represent a very poor investment, especially at the present time with its abnormal fluctuations in prices. Inventories should be kept down to minimum quantities required to assure continuous operations of the plant.

Team Work

The foundation of success is team work. Production must be controlled and a close co-operation between departments and fellow-foremen is, therefore, essential. The rag room foreman is responsible for the prompt delivery of raw materials to bleach boilers and beaters. Here the foreman will see to it that the stock is prepared quickly and in sufficient quantities for the paper machines. Thus the machine room foreman will be in a position to attain maximum production. The finishing room foreman and shipper will then do "their bit" to expedite operations and have the goods on the way to the customers.

There must be no cog missing in the wheel. One department depends on the other, and if one branch fails to do its duty, the whole enterprise will suffer. Shakespeare epitomized that lack of team work fittingly when he wrote "There is something rotten in the state of Denmark."

Relation with Labor

Foremen must learn to help the other fellow, and not only to "boss" him. They should show that they are interested in his welfare and appreciate his work. Give now and then a few words of encouragement and show human sympathy. Credit and justice must be given when due. On the other hand, the foreman must not hesitate to express his dissatisfaction when necessary. He must be able to convince his men that he means what he says and expects obedience and implicit attention to his orders.

Safety Work

To develop and spread the movement for industrial safety is another very important duty of the foreman. He must interpret to his men the meaning of accident prevention and instruct new employees as to the hazard of their particular work. He should manifest his moral responsibility to protect his help by organizing safety committees, educating them to observe precautions against accidents and providing safety devices wherever necessary.

Care of Materials, Tools, Etc.

Materials, tools and equipment entrusted to his care must be handled economically, and all willful waste must be avoided. Machines should be kept in good condition and repairs made promptly and thoroughly. Cleanliness and order should prevail in his department. Slovenly conditions are detrimental to results. Men can't be expected to do good and neat work in a dirty and untidy shop or department, where materials and refuse are scattered all over the floors, under machines and work benches, or piled in disorderly heaps in corners and recesses.

Cost Records

The foreman must understand and always bear in mind that cost plays the most vital part in any industry or business. He should realize that the cost clerk or the cost department cannot establish true cost figures unless the records made out by the foreman or his subordinates are correct and absolutely dependable. Accurate computation of costs is possible only when primary reports present facts and not guesses.

Inspection of Work

The inspection of the finished product must be done with the greatest possible care, and the foreman must bear uppermost in mind that the firm's reputation is built upon the quality of its product and the promptness of service rendered to customers. To make, ship and market a product below the standard required for its grade will irreparably injure the prestige of the manufacturer.

Personality

The foreman must have tact. It requires that qualification to handle men so that they will pull with him instead of opposing him in every conceivable way. Silent opposition is a dangerous factor to have in any shop or department, its destructive powers are immeasurably harmful to real success.

A man promoted from the ranks will especially require a great deal of tact to convince his former co-workers that they will have to obey his orders, and yet avoid creating an impression of being an "upstart" or "bully." Many a newly promoted foreman has failed utterly, in spite of ability, energy and good intentions, just because he insisted upon being called "Mister" by his associates and co-workers, instead of the familiar "John" or "Mike" they were used to calling him until yesterday.

Tact will find a solution to this very intricate problem which confronts practically every man promoted from the ranks. No substantial advice "how to do it" could be given; all depends on circumstances and individualities of the persons concerned. By treating his men according to the sensitiveness of their personal natures, a foreman will be able to have them respect him and still retain their feeling of friendship and solidarity toward him.

Be optimistic and cheerful, even if things don't go as you would like to have them. Create the "Come-along, men, now-all-together" spirit. Nothing irritates and depresses help more than the foreman with the undertaker's visage, whose appearance is enough to at once spread gloom and funeral atmosphere about the department. Men thus inclined ought to join the reformers and get out of a place where a friendly smile or grin and good fellowship mean so very much and act as a stimulant to higher efficiency and production.

Don't shirk responsibility. Be on the job. To be early on the job means to have the work well in hand: to watch the clock and rush out at the end of the day means very little interest in the work and place; it has a demoralizing effect on the man under you.

Practice self-control; anger is harmful. A man can be firm and assertive without resorting to swearing and profane language.

Study your men, watch for their aptitudes and peculiarities. To know how "to take" a person is the keynote of successful handling of help. To be a good judge of human nature is furthermore a great asset in selecting and hiring of new help. To hire the right man for the right place is necessary, for excessive labor turn-over is expensive.

Don't be satisfied with promotion and mere ability to handle your department proficiently. Grow with your job, study and prepare yourself for the next chance. Read books on production, and become acquainted with some legal points pertaining to employment of labor, such as regulations for women and minors, labor on holidays and Sundays, maximum hours of labor and so on.

Self improvement and endeavor to grow with the job are fundamental to real success.

Power Plant Management

Mechanical Draft

By ROBERT JUNE, M. E.

THE attainment of high efficiency in the combustion of fuel is to a large extent dependent upon proper draft regulation. If there is no draft, combustion cannot take place. If there is insufficient draft, an immense amount of fuel is wasted and the boilers will not produce enough steam to meet plant requirements. If there is too much draft, you heat up all out doors with the B. T. U.s emitted from your stack. So you must have draft, and you want just the right amount.

The ideal draft is that which enables the boiler to carry the full load, which producing the highest practicable percentage of CO_2 and the lowest percentage of CO in the uptake gases. This ideal draft naturally varies with the individual plant, and with changing conditions in the boiler room. Among the factors which determine the amount of draft required are kind and grade of fuel, design of furnaces and grates, and in particular the rating at which the boilers are driven. Thus, other things remaining constant, more draft is required to produce 20,000 lbs. of steam an hour from a boiler to produce 10,000 lbs.

A consideration of the facts just recited leads inevitably to the conclusion that every boiler should be equipped with a draft gauge. You must find out what the proper drafts are for different loads and other varying conditions on your boilers, and then see that exactly the required drafts are supplied. It is not our present purpose, however, to discuss draft gauges, but rather the means of supplying the predetermined drafts.

Before starting our discussion let us define the term "draft." Ordinarily this word is applied to two different conditions; first, the difference in head or pressure available for producing motion to gases; and second, the actual motion of gases themselves without regard to pressure. We will ignore this second meaning, and use the word "draft" as denoting the difference in density and pressure of the gases and air at various points.

Natural Draft

Forty years ago, nature alone was used for furnishing draft for furnaces. Since the weight of the column of hot gases in the chimney is less than the weight of an equal column of the cooler outside air, there is produced at the grate a difference in pressure which forces the hot gases up and out of the chimney.

With natural draft the chimney has to do three essential things.

1. Draw the air through the grates and fuel bed.
2. Draw the gases through the setting and tubes.
3. Draw the gases through the breeching to the stack.

With free-burning bituminous coal at moderate rates of combustion the draft required for operations No. 2 and No. 3 may be approximately equivalent to the draft required for operation No. 1. However, if the coal is of poor grade, considerably more draft may be required for No. 1 than for Nos. 2 and 3. As a matter of fact, with fine anthracite, we may require five times as much draft for operation No. 1 as for the others. This means that our chimney must be designed to take care of operation No. 1, whereas, with the use of mechanical draft, we can reduce considerably the functions of the chimney for this particular operation.

With natural draft every time the fire door is opened, a blast of cold air is drawn in which scrubs the tubes and boiler shell, placing strains on the metal and furnace walls, decreasing the rate of heat absorption and cooling the fire. In addition the gases are "Short circuited," the strong suction pulling them through the boiler at high velocity, so that they take the shortest path to reach the stack, and come in contact with only a portion of the tubes and shell, so that they leave the boiler with much of the heat in them which they woud give up if made to pass through with lower velocity.

The draft produced by a stack depends mainly upon its height and the temperature of the uptake gases.

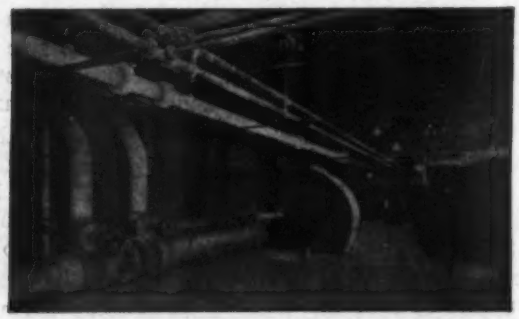
Chimneys should always be designed to meet the maximum requirements, permitting the damper to be closed at times. There is usually no practicable means of increasing natural draft per se after the maximum has been reached. It must also be remembered that natural draft is particularly susceptible to atmospheric influence and may be seriously impaired by adverse winds.

Mechanical Draft

In view of the limitations of natural draft, it is not surprising to find that in many cases mechanical draft possesses very great advantages and under certain conditions is indispensable. Mechanical draft is very flexible and readily adjusted to effect various rates of combustion.

Among the advantages of mechanical draft are:

1. It costs far less to install a compact and efficient mechanical draft system than it does to lay foundations and build a great chimney.
2. It makes possible any percentage of overload, thus going far beyond the limits of chimney draft.



A fine example of forced draft installation

It is not at all unusual, with a properly designed mechanical draft equipment, to develop from 125 percent to 225 percent of the rated output of the boilers. If underfed stokers are used, much higher overloads can be carried. The mechanical draft system of handling peak loads is usually found much more desirable than the method of installing sufficient rated boiler capacity to take care of the maximum peak loads, and it has found especial favor in those plants which are forced to take care of high peaks during short periods of the year as well as those which run at continuous heavy overloads.

3. Inferior and cheap grades of coal which require a strong draft can be burned efficiently. Thus, the installation of mechanical draft at times makes possible the substitution of a cheap coal for a more expensive one.
4. It is independent of climatic conditions.
5. It assures individual draft control of each boiler, thus enabling operators to meet the requirements of complete combustion under existing conditions. This is very important. With natural draft the boiler nearest the stack usually receives more than its share of the draft and the boiler farthest from the stack gets much less than its share, hence rendering accurate individual draft control of the various boilers very difficult, if not impossible.
6. It enables operators to get up steam, or take on heavy overloads very quickly.
7. Short circuiting of gases is eliminated, as a boiler may be operated with a partially closed damper. This makes the entire heating surfaces of the boiler effective, increases the production of steam, and prevents strains due to uneven temperatures.
8. Where with natural draft manufacturing losses would result from the shutting down of one or more boilers, such losses can be eliminated by the use of mechanical draft which permits increasing the output of the remaining boilers.

Types of Mechanical Draft Equipment

Mechanical draft may be produced by any one of three distinct systems:

1. Vacuum or induced draft.
2. Forced draft.
3. Balanced draft.

With the first or induced draft system, a partial vacuum is created above the fire, the effect being similar to, but more pronounced than natural draft.

Forced draft is produced by pressure developed in the ashpit, the effect being to force air through the fuel bed.

Balanced draft is a combination of forced and induced. Forced draft is used to drive the air through the fuel bed only. Beyond this point induced draft is depended upon to create a suction throughout the furnace and setting. The adjustment, or balance, is such as to provide for practically atmospheric pressure in the combustion chambers—an extremely desirable condition.

Induced Draft

The earliest form of induced draft consisted of the application of jets of live steam over the fuel bed or at the base of the stack. Tests have shown these jets to consume from five to eleven percent of the total steam generated. They have proven to be extremely wasteful and should be tolerated only in plants where boilers need to be forced for very short and infrequent periods.

In the modern plant induced draft is produced by means of a fan, the suction side of which is connected with the uptake or breeching of the boiler of batteries of boilers. The products of combustion are usually exhausted through a stub stack. In a typical installation two fans of the duplex type are placed above the boiler setting. A by-pass is usually provided so that the fan can be cut off entirely in case of accident or when mechanical draft is not required.

Since the induced draft fan handles hot gases it must, under average conditions, have a capacity approximately double that of the forced-draft fan which delivers cold air, but as the gases are of lower density

the power required per cubic foot handled is less.

The advantages of induced draft over forced draft are very pronounced. Among the advantages, are:

1. With induced draft fires will burn evenly all over the grates; there is no trouble from holes or patches burning in certain parts of the fuel bed as with forced draft unless carefully watched.

2. It is never necessary to shut off the draft when firing as there is no pressure in the combustion chamber to force scorching gases and dust out of the firing doors when opened. The ashpit can be cleaned any time without shutting off the draft as at all points the flow is toward the place at which the greatest suction or depression in pressure prevails, this, of course, being within the induced draft fan.

3. The ventilation of the boiler room is better, as the air drawn into the furnaces from the boiler room is replaced by fresh air from the outside, whereas with forced draft there is a tendency for smoke and ill-smelling gases to escape through crevices in the boiling setting and through leaks in the fumes especially when the path of the waste gases to the atmosphere is restricted by economizers.

4. The boiler flues can be kept cleaner, as there is less lifting effect at the fire and consequently ashes and dirt are not carried in suspension and deposited in places where the velocity of the gases is lowered, to the same extent as is the case with forced draft.

5. With induced draft very much larger fuel economizers can be used, as the temperature of the gases can be reduced to a very low point, enabling a large percentage of the heat leaving the boiler to be recovered without bad effects.

Induced draft can be used with all kinds of fuel and it is adapted to ordinary grates, rocking grate bars, chain grates, and other types of furnaces except those in which underfeed stokers and hollow blast grates are employed. An induced draft plant costs considerably more than a forced draft on account of the larger fan required, but the operating expenses are but little greater. With a boiler plant of 1,000 horsepower or more the cost of a single induced draft fan, engine, stack, etc., will approximate from 40 to 50 percent of the outlay required for a brick chimney of equivalent capacity and the double-fan outfit will approximate from 56 to 60 percent. The double-fan system is particularly adapted to plants which operate continuously and where even a temporary breakdown is a serious inconvenience.

Forced Draft

Whenever the greater portion of the resistance offered to the flow of air is encountered in the furnace, it is advisable to use forced draft. Forced draft is created by the development of pressure in the ashpit through the agency of a fan or turbo-blower. The most approved method is to pass the air through the bridge wall thence toward the front of the grate, though it may enter through an underground duct or through the side of the setting. Forced draft is usually adopted in old plants where increased demands for power require that the boilers be forced far above their rating to save the heavy expense of new boilers, or in plants burning refuse, anthracite culm or screenings, which require an intense draft for efficient combustion. Forced draft is also well adapted for underfed stokers of the retort type, hollow blast grates, and the closed fire-hole system. The air supply may be taken from an air chamber built

The power turbo-blower

around the breeching, thereby supplying the heated air to the fan and effecting a lower temperature in the breeching and a higher temperature in the furnace. The objection is sometimes raised against forced draft that the gases tend to pass outward through the fire door when the fire is cleaned or replenished, since the pressure in the furnace is greater than atmospheric. This objection may usually be overcome by suitable dampers in the blast pipe which are closed on opening the fire doors, or by having sufficient stack action to create a partial vacuum in the combustion chamber. With a boiler plant of 1,000 horsepower or more the cost of a forced-draft fan, engine, and stack will approximate from 20 to 30 per cent of the outlay for an equivalent brick chimney. The power consumption will depend upon the character and efficiency of the motor or engine and will range from one to five per cent of the total capacity.

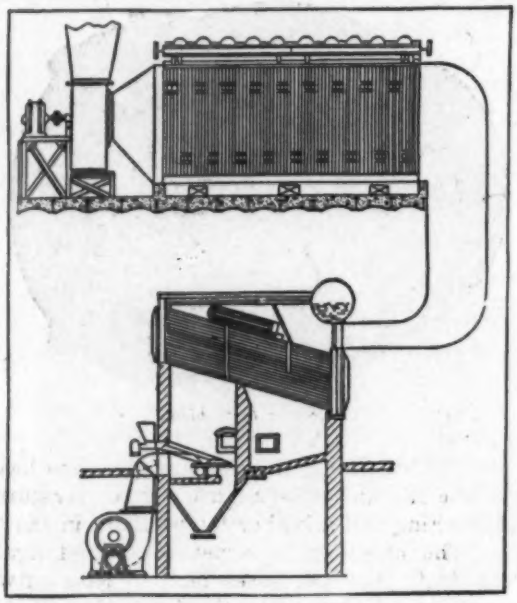
In recent years there has been a very marked increase in the use of turbo-undergrate draft blowers in place of the forced draft fan. Turbo-blowers are installed in each setting. They consist essentially of small impulse steam turbines directly connected to special design propeller fans fixed in the side walls of the setting. The fan discharges below the grate and may be automatically controlled by damper regulation. The turbine exhaust may be discharged into the ashpit to prevent clinkers, or it may be used in the feed-water.

Turbo-blowers are the least expensive of all kinds

of mechanical draft to install and their ease of regulation is a point which commends them very much to the average plant engineer.

Types of Fans

Centrifugal fans used with either forced or induced draft may be divided into two general classes: those having rotors with a few straight or slightly curved blades of considerable length, commonly designated as steel-plate fans, and those having rotors with a number of short curved blades generally known as multivane fans. In general the



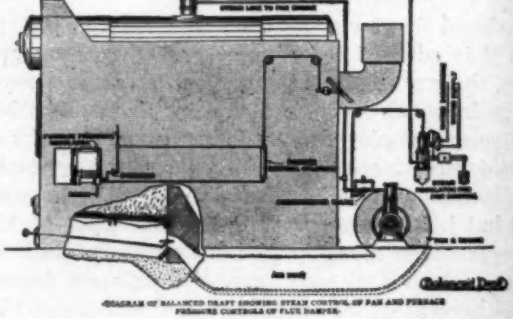
Arrangement of induced and forced draft fans with economizer and underfeed stoker

multi-vane fan is more efficient than a steel-plate fan as ordinarily constructed, and requires less space than the latter for equal capacity and efficiency. Another important advantage lies in the fact that the higher speed of the multi-vane fan permits of direct connection to high-speed prime movers. The steel-plate blower, however, is not necessarily a low efficiency device, since by special design it may be made to give higher efficiencies than obtained from the cured short blade construction. Where first cost is a consideration and where space limitation is of little consequence, the steel-plate fan may be used to advantage. In small plants the power requirements for the mechanical draft system are low and the type of fan has but little effect on the overall cost of operation, but in large central stations the power requirements are considerable and the type and attending pressure characteristics greatly influence the ultimate economy.

Balanced Draft

In the balanced draft system a uniform pressure, nearly atmospheric, is maintained in the furnace for all rates of combustion. In actual practice this ideal condition does not obtain, the pressure of the furnace gases being slightly below that of the atmosphere. To maintain atmospheric pressure in the furnace, natural draft cannot be used, but instead a system of forced draft is utilized which gives a constant volume of air at variable pressure for a given speed of the blower, the pressure being controlled automatically according to the resistance of the fuel bed.

There are several ways in which this may be done. One method consists of a damper controller which automatically changes the position of the boiler damper in unison with the varying speed of the blower that supplies the air to the furnace, the speed of the blower in turn being varied by the steam pressure. Another method and the more preferable, is by using a furnace pressure regulator controlled by the pressure of the gases in the furnace chamber. When a change of gas pressure occurs the damper regulator operates the flue damper in such a way that it counteracts the change in pressure, tending, therefore, to maintain a uniform pressure in the furnace chamber for all rates of combustion. In this way the excess suction of the chimney beyond that required to remove the gases from the boiler is eliminated, and the chimney has but one function to perform, that of removing the gases of combustion from the boiler fires instead of having also to supply air to the furnace. As the entire supply of air is controlled by the power-driven blower, which is independent of atmospheric conditions, the fire temperatures may be controlled closely with great rapidity.



In analyzing the effect of balanced draft in raising the efficiency and capacity of boilers, it is necessary to consider the matter from several points of view. About 12 pounds of air are required per pound of carbon burned to complete combustion, and since any air in excess of this amount does not combine with the coal in combustion, but merely dilutes and cools the gases, it can be seen that only when the correct amount of air is obtained does the fire develop its maximum temperature.

As a boiler absorbs heat in proportion to the difference of temperature between furnace gases and itself, the higher the temperature of the furnace

gases above that of the boiler the more rapid and greater, obviously, will be the absorption of heat by the latter.

It is not only in this way that the thermal efficiency of the fuel is raised, however. By eliminating all excess air the volume of gas for any definite weight of coal consumed is reduced to a minimum, and it follows, therefore, that the velocity of these gases in passing from the furnace through the boiler and into the chimney is proportionately reduced. The time during which the gases are in contact with the boiler is an element which affects the heat transfer from gas to boiler, hence it naturally follows that the reduction in the velocity of these gases represents gain in the heat absorbing capacity of the boilers, and is somewhat analogous to increasing the heating surface, but without increasing the radiation and combustion losses incident thereto.

This comparatively slow movement of gas, made possible by the balanced draft, is giving most gratifying results by enabling increased evaporation per pound of coal, permitting in many instances the use of a lower grade of coal than could be used otherwise, lower depreciation and lower maintenance charges, while the smaller coal consumption effects reduced labor costs.

Safeguarding the Worker in the Machine Room

By RAYMOND A. STEFFEN
The Champion Coated Paper Company

IN CONSIDERING the safeguarding of the employee in the paper mill, the desired results must be approached from two separate and distinct angles. First, the guarding of all machinery in use by machine guards and, second, the education of the workers to the extent of realizing that each and every one employed plays his or her part in the establishing of a national or international safety record. Make it known by both written and oral word that you are after such an honorable record and when such a one is established even partially, make it known by an article in some trade or safety paper, then use these printed articles for bulletins. Some firms use their safety record in their advertising medium, which is a commendable feature, causing the employee to be proud of what he or she has helped to establish.

Most authorities speaking or writing on the subject agree that machine guarding today plays a minor part in the isolation of the accident. However, a reasonable amount of this phase of the work must be done in order to first protect the man and second, to prove beyond a doubt to him that you are vitally interested in the reduction of accidents and are willing to do your part; i. e. produce a safe place in which to work.

Statistics also show that more fingers and toes are injured than any other part of the worker's body. It is well to bring this to their attention also. A simple worded, home-made bulletin stating these facts even if only written on your letterhead with a typewriter will prove beneficial in gaining attention and interest of your employees.

Because of the common practice of workers to go barefoot in the Machine Room due to large amount of water used, many accidents happen to feet. Impress upon their minds the necessity of wearing shoes at all times. During a wash-up, they may be removed if so desired, but should immediately be replaced.

In changing the wire, care should be taken in removing suction boxes, slice bars and rolls. A small truck 60″ x 40″ with two middle wheels larger and the center of gravity resting upon them, will be found helpful at this time. Care should be taken to avoid being cut on edge of wire and should small cuts occur, they should be treated immediately to prevent infection.

All exposed steam pipes around walkways and working spaces should be covered or concealed to prevent burns to those coming in contact with them. A little attention to this item will help your record and earn the co-operation of the worker. This last is the big thing for which you are striving, remember.

On either cylinder or Fourdrinier machines, all pulleys driving press rolls and dryers should be well guarded and guards kept in place at all times. A simple substantial pipe railing around these rapidly moving parts will suffice. However for complete safety it is well to improve upon this by covering them with sheet metal set upon the railing so as to be easily removed. This will also prevent the throwing of oil which makes walking dangerous. The modern way for driving paper machines is the directly-driven motor drive, but as few mills to date have eqiupped their machines thus, we will dwell mostly upon the shaft and pulley type of drive.

All meshed gears on individual dryers should be adequately guarded and kept in place. Millwrights should be held responsible for the upkeep of all guards at all times because they frequently repair machines and forget the importance of replacing the protecting agent.

In carrying the paper over the dryers, many minor

burns are liable to occur unless care is taken to avoid them. The employee in the operation of this task should be impressed with the hazards attendant and be cautioned against any horse-play and spectacular actions. His mind should be solely on the work at hand. Should a break occur and dryer spears be employed to remove paper from dryers, care should be exercised to prevent the points of same injuring

Guarding machine drives. Guard railings with sheet iron panels, removable for cleaning, on Marshall drive. Note railings and toe-boards on platform back of dryers. Frame in foreground contains printed instructions for operating elevator

any one. When through with spears, they should be placed on brackets swung under running board and kept off the floor at all times. Many serious injuries have resulted from workers walking into spear points when same were laying on the floor. Again the necessity for wearing shoes is seen. Accidents sometimes happen to bystanding workmen when fellow employee is using spear by being hit with blunt end of handle. To avoid this, a small piece of white canvas 9″ x 12″ tacked to extreme end of handle will act as a warning to stear clear from the immediate vicinity.

All dryer bearing covers on the front side of a machine should have rounded edges to prevent minor cuts and bruises. All running boards and handrails will bear frequent inspection to prevent falls which are to be avoided at all times, but especially at this point.

Calendars on paper machines are responsible for most of the severe injuries to fingers. In putting paper through the stack, the paper should be handled with the thumb and side of the forefinger, all five fingers doubled into a fist. Thus no fingers protrude and a fist is too large to even start through the "nip" should the hand touch the rolls. This lesson should be taught often as old employees become calloused to danger and new men are coming into the plant without this simple knowledge of protection.

One of the most important items to watch and warn workers about in the paper mill is the long protruding set-screw. Whether it be a large set-screw holding collars on main drives of press rolls and calendars or the small ones on collars used on winders, they should be of some standard approved type of safety set-screw with the counter sunk tightening control and be flush with the shaft or collar upon which they operate. This is a rule which both employer and employee have learned at great cost and should be profited by.

The use of sulphuric acid to clean felts and wires is a common practice in most mills and should be safeguarded. Before the containers are opened, the carboys should be placed in an inclinator either of simple home-made type or of standard design of which many are on the market. An employee using acid should be cautioned about the burning properties of same and be equipped with goggles for eye protection. Acid should always be handled in copper or glass containers which should not leak.

Pulleys and gears driving winders should be well protected by a sheet iron cover attached to the machine parts. In fact all guards should be attached

A well guarded drum winder. Note excellent wire grill guard over drive and guard in front of roll being wound

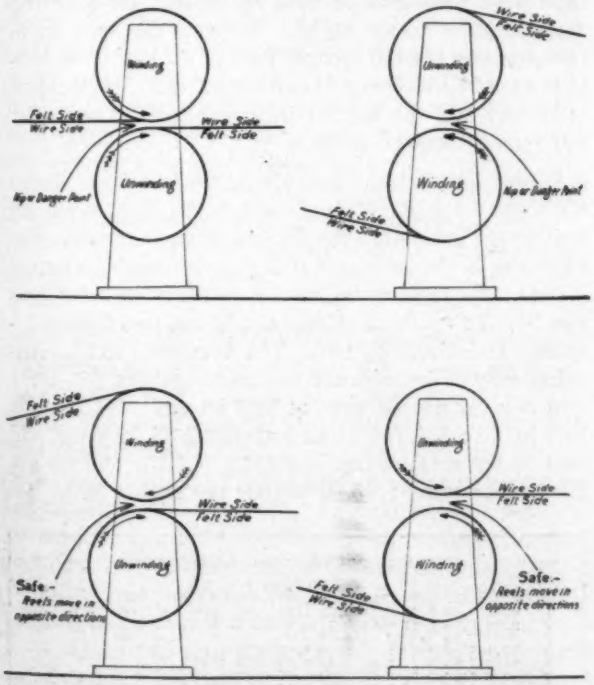
to the machine itself wherever possible, in preference to attaching them to the floor. This enables better and easier cleaning facilities and makes the guard a part of the machine and not an individual unit. On two-drum rewinders, flange pulleys driving outside

drum of winders should be covered with a heavy sheet iron guard as these pulleys revolve close to controlling levers and expose a glaring hazard.

It is understood of course that a clean floor is a necessity for first class production, but it also centers into the safety proposition. Grease, oil, and "broke" on floors around calendars and rewinder should be avoided. Garbage from lunches and discarded chewing tobacco can be taken care of by a simple paper cuspidor held in a metal container and emptied daily.

Proper lighting of the paper mill plays a prominent part in the elimination of accidents. Plenty of light at the "wet end" diffused from reflectors set on an angle just below the overhead cranes gives excellent results. Three lights suspended overhead between press rolls along dryers should be well lighted to allow operators to carry paper over safely and watch their step. The space between calendar and dryers should receive especial attention as work at this point is usually swift and hazardous.

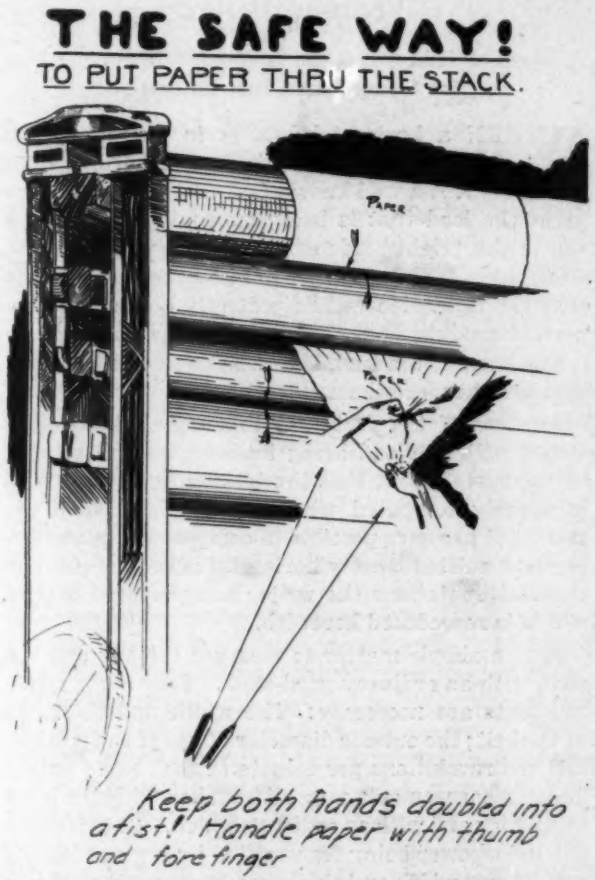
As to the education of the worker, this can be accomplished in many ways. The printed bulletin, the excellent bulletins of the National Safety Council, the knowledge that you are willing to do your part and the word of mouth warning. Under the latter phase, the foreman is the man who must be absolutely sold to safety and facts and figures so pre-



Above—Unsafe method of operating stack reels. Below—Safe method. Paper can be easily started on top roll if man is placed at each end of reels. Note that in both methods the paper goes to the drum rewinder with the wire side up

sented to him to make him an enthusiastic safety booster. As a rule he is a busy man with a keen eye to production, but if he is made to understand that "Safety must be First" all will be well. A good foreman can produce some good safety records as well as good paper if properly and tactfully sold to the plan.

In some mills, safety committees have been functioning for years and have done much by word-of-mouth warnings to fellow-workers. However, I feel the safety idea is that no matter who the man might be who sees another exposed to a hazard, he will warn the one exposed. Be he laborer, skilled worker,


THE SAFE WAY!
TO PUT PAPER THRU THE STACK.
Paper
Paper
Keep both hands doubled into a fist! Handle paper with thumb and fore finger

foreman, superintendent, general manager, president, or the Safety Engineer, where employed, his warning will carry weight whenever heard. Let every one know that he is a committee of one to prevent accidents.

The National Safety Council, a co-operative, non commercial organization with headquarters in Chicago extends many novel and interesting features which will interest you and your workers in accident prevention. The bulletins covering specific hazards are always good. Many times after posting a bulletin, I have heard the remark from some veteran of the mill "That's just how so-and-so got hurt. Believe me that's a good one."

Prizes for safety suggestions are good because they start the men thinking along the lines desired. Posting of your monthly accident record is good because they can see just how far along the road they have progressed. Nothing in the dark—everything fair and square. Give your workers a target to aim at. Encourage them constantly. Show them facts and figures and they will produce some gratifying results.

Pointers for the Engineer

By W. F. SCHAPHORST, M. E.

How Much Power Is That Belt Transmitting?

A Method That Gives the Answer Without the Use of Complicated Instruments

WHEN a horizontal belt is in operation, and most important drive belts are horizontal or nearly so, it is a well known fact that no matter how great the load that is being transmitted there is a sag in the "tight" side of the belt as well as in the slack side. It is impossible to make the pull so great that the tight side will be perfectly horizontal, or a perfect straight line. There will always be sag.

The greater the load, the less the sag on the tight side and the more the sag on the slack side.

In view of the fact that this sag on both sides varies with the load being transmitted and in view of the further fact that the tension in a belt can be accurately computed when the sag and span are known, it becomes possible to compute the power being transmitted by any horizontal belt. To assist in these computations the writer has prepared a table which is reproduced herewith.

It is a simple matter to measure the sag and the span with an ordinary yard-stick. Four other measurements are necessary: The width and thickness of the belt; the outside diameter of one of the pulleys; and the revolutions per minute of that same pulley. These measurements may all be taken with the same yard-stick and with an ordinary watch. To determine the horsepower being transmitted by a given leather belt of any width and thickness, measure the span of the slack side as indicated on the sketch. This span is not the distance from center to center of the shaft but is the distance between the points where the belt leaves one pulley and touches the other. Then measure the sag. The sag is the greatest vertical distance between the belt and a straight line connecting the contact points as shown on the sketch.

Next, measure the span and sag of the tight side again, observing the points of "making and breaking contact" as explained above. It makes no difference whether the belt is a "bottom pull" or "top pull" belt, this method will give the horsepower transmitted in either case.

Then, referring to the table, find the tension corresponding to the span and sag of the slack side, which we will call "A." Then find the tension corresponding to the span and sag of the tight side, which we will call "B."

Then subtract "A" from "B."

Then multiply by the width of the belt in inches.

Then multiply by the thickness of the belt in inches.

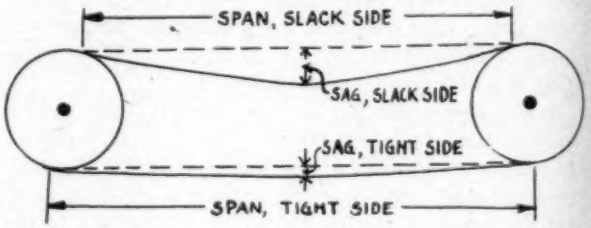
Then multiply by the outside diameter of one of the pulleys in inches.

Then multiply by the revolutions per minute made by that same pulley.

Then multiply by .000007933.

The answer is the horsepower being transmitted by the belt at the time of measurement.

In case the sag is less than one inch, which may



often be the case where pulleys are close together, this same table can be used by simply shifting the decimal point to the right. Thus, if the span is 10 feet and the sag 0.6 inch instead of 6 inches, the tension would be 105 pounds instead of 10.5. If the span is 12 feet and the sag 0.1 inch, the tension would be 907 pounds instead of 90.7.

In case the actual span of the belt does not agree with the span as given in the table, it is a simple matter to "estimate" the tension from the table. For example, if the span is 8 feet 6 inches and the sag is 1 inch, the tension would be midway between 40.3 and 51. To find this midpoint add the two figures together and divide by two. The answer is 45.65. Another way is to subtract the two numbers (51-40.3) which gives a difference of 10.7 inches. Then divide this by two ($10.7 \div 2$) and we get 5.35. Lastly, add this to the smaller number ($40.3 + 5.35$) and we get the same answer: 45.65 pounds per square inch.

TENSION, POUNDS PER SQUARE INCH

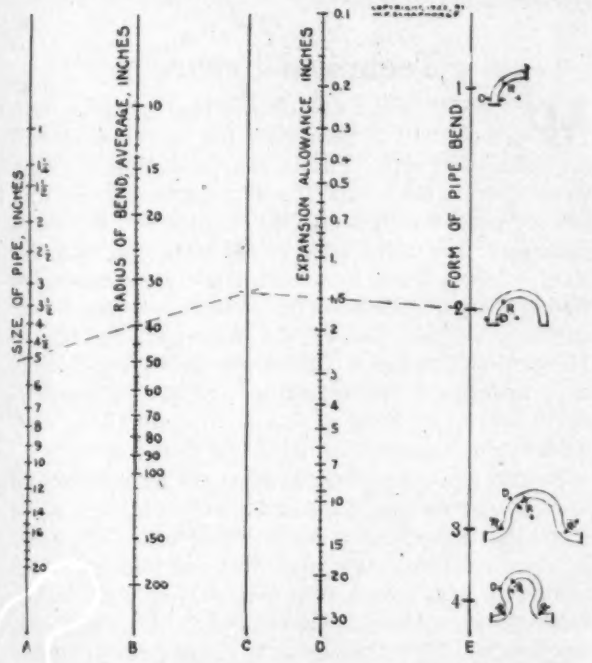
Span	Sag, Inches										
Feet	1	2	3	4	5	6	7	8	9	10	11	12
1	0.63	0.32	0.21	0.16	0.13	.105	.09	.079	.07	.063	.0572	.0525
2	2.52	1.26	0.84	0.63	0.5	0.42	.36	.315	.28	.252	.229	.21
3	5.67	2.84	1.89	1.41	1.13	0.95	.81	.71	.64	.567	.515	.472
4	10.1	5.05	3.4	2.52	2.02	1.68	1.44	1.26	1.12	1.01	.917	.81
5	15.7	7.85	5.2	3.92	3.14	2.62	2.24	1.96	1.75	1.57	1.43	1.31
6	22.6	11.3	7.5	5.65	4.52	3.77	3.22	2.82	2.51	2.26	2.05	1.88
7	31	15.5	10.3	7.75	6.2	5.17	4.43	3.88	3.44	3.1	2.82	2.58
8	40.3	20.2	13.4	10.1	8.07	6.72	5.76	5.05	4.48	4.03	3.67	3.36
9	51	25.5	17	12.7	10.2	8.5	7.28	5.38	5.67	5.1	4.63	4.25
10	63	31.5	21	15.7	12.6	10.5	9	7.88	7	6.3	5.72	5.25
12	90.7	45.4	30	22.6	18.1	15.1	12.9	11.3	10.1	9.07	8.24	7.56
14	123	61.5	41	30.8	24.6	20.5	17.6	15.4	13.7	12.3	11.2	10.2
16	161	80.5	54	40	32.2	26.8	23	20.2	17.9	16.1	14.6	13.4
18	204	102	68	51	40.8	34	29.1	25.5	22.7	20.4	18.5	17
20	252	126	84	63	50.4	42	36	31.5	28	25.2	22.9	21
25	394	197	131	98.5	78.8	65.7	56.3	49.3	43.8	39.4	35.8	32.8
30	567	284	189	142	113	94.5	81	70.8	63	56.7	51.5	47.2
35	772	386	257	193	154	129	110	96.5	85.7	77.2	70.2	64.3
40	1008	504	336	252	202	168	144	126	112	101	91.6	84
45	1275	638	425	319	255	212	182	159	142	128	116	106
50	1575	788	525	394	315	262	225	197	175	158	143	131
55	1905	953	635	476	381	318	272	238	212	191	173	159
60	2265	1133	756	566	453	378	324	283	252	227	206	189

A Useful Pipe Bending Chart

PIPE bends are coming into more general use in paper mills, with the advent of higher steam pressures and superheated steam. So, to assist the engineer, here is a chart that will be found valuable and convenient for determining the radius of bend that should be given to common forms of pipe bends, numbers 1, 2, 3 and 4, as shown at the right, column E.

Or, knowing the radius of bend, the size pipe, and the form of bend, column D gives the expansion allowance of that bend.

For example, a five-inch pipe was made to a radius



of 40 inches, the bend being a common U-bend as shown by No. 2 in column E. What expansion may be allowed?

The dotted line drawn across this chart shows how the chart is used. Run a straight line through the 5 column A and the 40 column B and locate the intersection with column C. Then from that point of intersection run over to the mark in column E opposite the figure 2, and the intersection through column D gives the answer as one and five-tenths inches expansion allowance.

If the size of pipe were the same, 5 inches, the average radius 40 inches and the bend were a "No. 4" bend, the expansion allowance would be 3.7 inches. If the bend were a "No. 1" bend, the expansion allowance would be 0.75 of one inch as the reader will be able to easily determine for himself from the chart.

Similarly, if the expansion allowance is already known, if the form of bend is known, and if the size of pipe is known, the average radius to which the bend should be made may be determined in the same way. In other words, knowing any three of the four factors given in columns A, B, D and E, the fourth or unknown factor is easily determined by following the method as explained above.

This chart is based upon the following much used and well known rules:

For Bend No. 1—Square the radius of bend in inches and multiply by 0.0026 and then divide by the outside diameter of the pipe in inches.

For Bend No. 2—Same as No. 1, but use 0.0052 instead of 0.0026.

For Bend No. 3—Same as No. 1, but use 0.0104.

For Bend No. 4—Same as No. 1, but use 0.013.

In the chart all of these operations are already performed—the radii are squared, exact outside pipe diameters are employed, and the proper factors are used.

Regulation of Boiler Feed

AMONG the many problems in paper mill power plant operation that have been given increasing attention on the part of engineers is proper boiler feedwater regulation, not only to obtain more heat out of the coal consumed, but also to cut down the labor cost of operation.

Ever since boilers first came into use, attempts have been made to build a reliable automatic device to control the feed water supply. It was sought to hold the boiler water absolutely level between very narrow fixed limits, and to regulate the feed water flow by turning the water full on or entirely off intermittently, according as the level in the boiler reached the lower level or the upper limit respectively. These devices almost invariably included floats, displacement members, diaphragms, boiling liquids in separate chambers, needle and pilot valves, and other complicated mechanism, all of which proved troublesome, frequently throwing them out of commission, so that finally they all fell into discard on account of their lack of reliability.

About 12 years ago engineers began to recognize that maintaining a constant water level in a boiler is detrimental to efficient operation, although all previous attempts at automatic control of the feed water flow had efficiency as the ultimate object. It was also recognized that intermittent feed water supply, characteristic of hand regulation and practically all ordinary means of feed water control, wastes heat.

It was then found that the boiler water level can be safely varied between certain limits, and that the weight represented by the space between these limits can be used to good advantage for storing heat at certain periods when the furnace is generating heat in excess of what is required, and at other times can be utilized to supply heat when the heat delivered by the furnace falls short of the demand. Regulation based on the principle is today considered the "proper kind" by most if not all consulting power plant engineers.

Dame Nature vs. the Engineer

NATURE is often called Dame Nature, which means that Nature is a woman. I believe it because women can't be understood and neither can Nature.

For example, wherever you go or whatever you do, you invariably have to fight for what you want. Nature has a tendency to give you the opposite of what your heart craves.

Piston rods and cylinders are made nice and smooth in the first place and it is our desire to keep them so, but little old Dame Nature takes a hand in the affair and does all she can do to make Sir Piston Rod and Sir Cylinder Walls rough. Same is true of bearings, valve surfaces, the rails in our railways, and so on ad infinitum.

On the other side of the fence we have friction drives that are made rough in the first place, but Dame Nature is opposed to roughness just for the sake of contrariness, and lo and behold, the surface soon becomes smooth. A file is made rough, but does it STAY rough? Even gears have a tendency to wear down smooth. Mother Nature sometimes tries to make gears smooth by breaking the teeth off. Very often, you see, she is hasty and doesn't use good judgment.

If you want to keep a thing sharp, you can't do it without constantly opposing Nature. If you want to keep a thing dull, look out or it will get sharp.

Nature is a woman, without doubt.

Taking Care of Belts

I HAVE had more than average experience with belting and power transmission problems during the past 15 years and have written a number of articles for the technical press on power transmission through belting.

Recently an editor of one of the foremost trade publications in a field where much belting is used asked me to explain why I was continually telling the user of belts that belts should be properly cared for. I was told that many of the readers of that publication do not care for articles of that kind. The editor wrote:

"Can't you give us some items on belts or transmission without so much reference to belt dressing?"

There is no question but that I am enthusiastic about taking proper care of belts to get best results. I admit it. I have had enough to do with belting to be convinced that taking care of a belt is the principal point of importance after its selection. I believe care is of as much or more importance than the kind of belt in use.

A number of years ago a well known mechanical engineer, assisted by the writer, made a series of tests on carefully treated belts, and in these tests it was demonstrated conclusively that good care is of vital importance.

I do not doubt but that many users of belts are opposed to treating them, and they have a right to be if they wish to be, but I have yet to read a single good argument in favor of the undressed or untreated belt. The only argument I know, which is only an excuse, is that it takes a little time to treat and care for a belt, and of course that is only a lazy man's argument. It would be very difficult for me to conscientiously write anything about power transmission through belts without mentioning the care that should be given to the belt. Belt treatment stops slip, and slip is the belt's greatest enemy. Slip is undesirable in efficient belt transmission.

Technical Errors

MISTAKES are made by the best of paper mill executives. A man must not be ridiculed simply because he errs. The Quebec bridge fell into the water twice. Each time it was designed by and was being erected by high-salaried engineers of much experience. The third time it did NOT fall into the river. James Watt, it is said, made some mistakes. Rudolph Diesel, himself, the inventor of the Diesel engine confessed before the American Society of Mechanical Engineers that he was nearly killed while experimenting with his engine. All of us make mistakes and after they are made we very likely consider them "bonehead" mistakes.

For example, a first class erector of machinery told me one on himself the other day. He said that some years ago he wanted to make a pipe coil. He espied a telephone pole out in the yard and this pole suggested to him this brilliant idea: Why not do the bending around the telephone pole? He did it. It worked fine. It did not occur to him until the job was finished that a coil of that kind is removed with great difficulty. He removed it by "unbending" the pipe. Next time he used a short post.

A consulting engineer, drawing a salary that is in the five figures, recently made a sketch for a large metal tank to be used in a certain building. Drawings were made and specifications were written in accordance with the consultant's directions. The consultant wrote his O.K. on the tracings with a perfectly self-satisfied air. The tank was made. It was a beautiful piece of work. But it was so large it wouldn't begin to go through any door in the building. It was necessary to unrivet the tank, enter it into the building piece by piece and do the riveting all over again. An expensive piece of consulting engineering.

Again, a man who unblushingly calls himself an "engineer" repaired (?) a globe valve a few days ago by inserting a new disc. He didn't remove the old disc but put the new disc in on top of the old one. He said to me, "I can't understand why that valve still leaks. I just put in a new disc this morning."

Another "engineer" had trouble with the inertia governor on the high-speed engine he was operating. The governor "hunted too much" to suit the engineer. Being a believer in always carrying plenty of baling wire in stock, he "fixed" it by wiring the governor to one of the arms of the flywheel. He then governed the engine himself by simply manipulating the throttle. It worked much better. He was proud of and boasted about his achievement until one day the belt broke, the engine, of course, raced, and centrifugal force disrupted the flywheel. Nobody was killed. Nobody was hurt. The "engineer" wasn't even fired.

How to Weigh Attached Irregular Parts

OCCASIONALLY in paper mills it is desired to know the weight of some part or other on a machine, but the part cannot be detached easily for weighing and it is too irregular to compute with ease. In such case the weight can be found indirectly by weighing the water displaced by the part, if the part projects in such a way that it can be made to displace water.

For example, the writer once had to determine the weight of a flywheel governor weight, which was made of cast iron, and which could not be detached without removing the whole governor from the engine.

I turned the flywheel to such a position that the weight was at its extreme low point. I then procured a rectangular sheet metal vessel and filled it with water. I weighed the vessel when it contained as much water as could be held in it.

Then I carried the vessel of water over to the engine and raised it so as to envelop the weighted end. Water was displaced, of course, but that is what was wanted. I raised the vessel until the water level cut the governor arm being sure all the while that the vessel was still holding as much water as possible while raised to that height.

Then I removed the vessel and again weighed it, this time with the remaining water. The weight of the governor end was then computed in this manner:

The first weight was 45.5 pounds and the second weight was 39.25 pounds. The weight of the water displaced was therefore

$$45.5 - 39.25 = 6.25 \text{ pounds.}$$

Now to compute the weight of the cast iron that displaced the water all that is necessary is to multiply by the specific gravity of cast iron which is 7.207, or

$$6.25 \times 7.207 = 45 \text{ pounds.}$$

The remainder of the arm was of rectangular cross-section whose weight was very easy to compute on the basis of 0.26 pound per cubic inch, which is the weight of cast iron.

In case other metal parts are to be weighed in this manner here are the specific gravities of metals which are most commonly used in mechanical constructions:

Cast iron	7.207
Wrought iron	7.78
Soft steel	7.833
Steel castings	7.917
Cast aluminum	2.60

Should it be desired to know the volume of the piece of metal in cubic inches divide the difference in weight (which is equal to the weight of the displaced water) by .0363. The result is the volume of the part in cubic inches.

This latter test will come in handy for finding the volume of any irregular substance that can be submerged in water without harm or without any absorption of water. Or, should one wish to find the specific gravity of coal, brick, rock, etc., this method reversed will serve the purpose. Weigh the rock, say, and then weigh the displaced water (which can be done by subtraction as already explained). Divide the former by the latter and the quotient is the specific gravity of the rock or other substance.

Benefits from Preliminary Impregnation of Pulpwood Chips

IMPREGNATING pulpwood chips with cooking liquor under pressure before the cooking action has commenced has been found decidely advantageous in the soda and sulphate processes of pulping. The required pressure is obtained by pumping cooking liquor into the digester after it has been completely filled and closed. The amount of pressure necessary, duration of treatment, and other factors vary with the type of cooking process, kind of chips used, quality of paper sought, etc. Details of the process may be had upon application to the U. S. Forest Products Laboratory at Madison, Wisconsin.

Laboratory cooks of treated chips on a fifty-pound scale, showed greater uniformity of cooking, increased yields, reduced bleach consumption, increased concentration of the cooking liquor, and reduced time for cooking.

Mill trials of the improved method on a three-ton scale resulted in increased concentration of the cooking liquor, reduced time for cooking, a reduction of the steam required for cooking from 9,000 to 6,000 pounds per digester charge, and an increase in the concentration of black liquor from the digester from 15 degrees to 18 degrees Baume.

The saving in the time required for cooking was estimated to be sufficient to offset the time required for impregnation. The saving in steam consumption made possible an increase of from 12 to 20 cooks per day from a 250 h.p. steam boiler. The increase in the density of the cooking liquor was estimated to make possible an increase of 25 per cent in the output of the recovery house.

Six Definite Things That Workers Want

6—To Throw Down Roots

By JAMES H. COLLINS

(Copyright 1922 by J. K. Novins)

THERE is a story of an Irishman who dug in a ditch all day for a dollar and a half and on his way home stopped at a gambling house. Throwing all his money on the table he lost it at the first turn of the wheel.

"Aw, well—easy come, easy go!"

So long as a worker's job is uncertain and he may find himself on his way to another factory or another town tomorrow, he thinks of money in pretty much the same way, living up to his earning capacity as he goes.

But stabilize his job by the methods described in these articles, demonstrate that there is justice and humanity in management, broaden his viewpoint and his opportunities, and the next thing he will want to do inevitably, is save money. Income has been made regular, and that makes it possible for him to systematize his expenditure, allowing a margin for saving. If he likes his job, he will probably like the community in which he works, and want to take root in it. If a single man, he will marry and settle down. If he is married he provides a better place for his family to live.

The whole viewpoint fits right into thrift, life insurance, the purchase of a home and good personal management of money.

In this connection, the employer has opportunities to advise, at least, and to help, if he wants to go that far—as many of the largest corporations in the country are doing today.

In a middle-western industrial town, during the war boom, while rents were rising and fortunes being made in real estate, a slick promoter quietly got busy among the employees of a small factory. He assured them that they could make some easy money by purchasing a group of old houses, dividing them on the two-family plan, letting half to tenants, and practically getting their own rent free.

A corporation was formed into which some of the workers put every dollar they possessed. The promoter made one payment on the property and disappeared with eight thousand dollars. Several of the workmen, officers of the corporation, were arrested, and one came near going to jail for technical theft of money that he had merely passed from a stockholder to the president.

Such occurrences are very common, and they show better than anything else how insecure are the savings of the average wage-earner. The manufacturer for whom these swindled people work knows most of them personally. A few words of advice from him would have scotched the real estate swindle in the beginning. His advice was not asked for, however, and he knew nothing of the fraud until called upon to get his employees out of the legal trouble.

Many a corporation now selling its own stock to its employees on installments began doing so because employees asked the company to provide a safe place for their savings. An employer may hesitate at becoming a savings banker for his employees. Fortunately, it is not necessary for him to go that far if he doesn't want to. As an advisor, he may help employees select trustworthy banking institutions, help them become their own bankers, and to facilitate thrift through payroll conveniences such as withholding a percentage of wages when requested, and attending to the routine of making deposits for them.

Most people know that they ought to save money. But they want to be put under some compulsion until saving becomes a habit. In fact, they like to be taught thriftiness, just as they would be taught to read a blue print. The first thing to be taught in thrift is regularity. In purchasing installment goods, buying a home, subscribing to shares in a building and loan association or a credit union, people establish an obligation that requires regular payments. In making these payments, they get the thrift habit.

A group of loan banks lending money to wage and salary earners turns this trait to account. A borrower wants $100, say, to buy some furniture. He gets the money from the loan bank, agreeing to pay back $2 a week, which clears off the debt in one year. Instead of paying directly on the loan, however, he pays on a $100 "investment certificate." At the end of the year he can use this investment certificate to pay off the loan, or may keep it, paying the loan off separately if he has other funds. Experience shows that many borrowers prefer to keep the investment certificate which earns five percent interest, or if this is not possible, they immediately begin buying another investment certificate, continuing the habit they have acquired of setting aside so much money weekly.

This natural tendency of people to save money systematically, once they have started, and the surprising ability of working people to manage their own financial affairs, can be made the basis for a co-operative bank in almost any factory, shop or office where as many as twenty-five people can be brought together. An employer need go no further than a little leadership at the outset—show how to organize and manage, his employees will do the rest themselves.

The co-operative bank has been thoroughly worked

out in all its details, and is successfully operating in many industrial establishments. Called the "credit union," it provides facilities for regular saving, yields interest on money, and also enables members to borrow in emergencies. It is not only a cure for loan shark troubles, which are the unsuspected cause of much discontent and slackness in many a work-force, but is a stabilizer where labor turnover is high.

For years it was assumed that telegraphers were natural tramps, roaming from city to city. The turnover in one big metropolitan telegraph office was enormous. When a credit union was organized in that office, hundreds of shifty employees settled down in steady jobs—much of their roaming had been done to get out of tangles caused by borrowing money at extortionate rates of interest.

Full instructions for organizing and operating a credit union can be had for twenty-five cents in "A Credit Union Primer," published by the Russel Sage Foundation, New York City. Even the books and forms can be purchased ready-made. Briefly, a number of employees come together, organize such a co-operative association, pay a small entrance fee, and buy one or more shares apiece, paying for them in weekly installments. The shares may have any value that seems best, and installments can be arranged according to conditions. Five-dollar shares at ten cents a week are paid for in a year, at the end of which time interest or dividends are paid, and new shares bought. Should a member wish to borrow money out of the fund thus created, he does so on his note, continues paying on his shares, and also begins paying off his loan by installments. Money can be borrowed in this way for reasonable rates of interest, in most cases six percent, and as there are only nominal expenses for stationery, the officers giving their services voluntarily, shareholders get something like five percent interest on a six percent loan basis, the co-operative bank usually paying at least one percent more than savings institutions in the same community.

The building and loan association is another co-operative thrift organization for home building, successfully conducted by employees in many an industrial plant, and requiring no more participation on the part of the employer.

Many employers still feel that the establishment and management of thrift institutions by themselves, for employees, is in the nature of interference with their private money affairs, and likely to cause complications, as well as burdensome detail. This even goes the length of refusing to make thrift deductions from pay envelopes.

But other employers are active in providing thrift facilities, such as installment sale of their corporation stock to employees, a thrift plan that has stood more than twenty years' test, and which is being adopted by some of the largest and most conservatively managed corporations in the country.

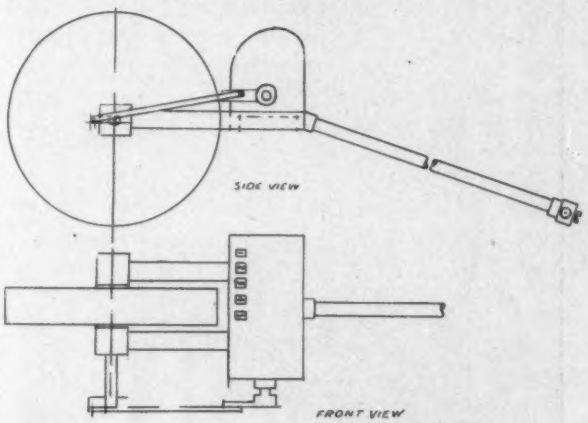
Whether he prefers to hold aloof, or to provide thrift facilities, an employer has a choice of plans that range from the giving of advice to becoming a depository for his employees' savings. The encouragement and teaching of thrift is something that workers clearly want, and thrift leadership is a benefit to themselves, to the concern for which they work, and to the community in which it is established.

Paper Measuring Counter

THE counter shown in the attached cut is the development of a great many years of continued study of the requirements of the paper industry.

There have been several counters so arranged that they would measure paper by means of passing it beneath a wheel of known circumference but practically all of these counters have had two or three severe drawbacks, possibly the most important being that the counter could not be readily set back and that the apparatus as a whole was not in proper balance.

A New England company who are specialists in high grade counting machines for special purposes



has worked out a very sturdy, strong and satisfactory mechanism which seems to embody all of the features required for a perfect counter for this purpose.

It will be noted from the cut that the face of the wheel has been considerably widened and that the counter is of the latest barrel type, so arranged that it may be set back if desired by means of a knob on the end opposite from the driving end, and by means of a crank and crank shaft it has direct connection with the measuring wheel.

This apparatus may be furnished with any circumference wheel desired, and it will doubtless find favor among those progressive manufacturers who are anxious to count their production at the minimum cost.

A Safety Committee will do well to inspect for rubbish in or near elevator shafts, stairways, dark corners, closets or openings through floors, says the National Safety Council.

The Electric Steam Generator

By HORACE DREVER and FRANK HODSON
The Electric Furnace Construction Co.

THE object of this paper is to set before the men of the pulp and paper industries a recent development in the conversion of electric energy into steam by means of the electric steam generator. The theory underlying will be touched on briefly, while stress will be put on the practical application.

Brief History of Electric Steam Generator

In Europe the conversion of surplus hydroelectric power into steam has been practiced for ten years, and particularly during the last five years has grown remarkably under the stimulating influences incident to the war. There are over three hundred installations known in Italy, France, Switzerland and Scandinavia,* countries, it will be noted, which have an abundance of waterpower and are lacking in coal resources. These generators are used in a variety of industries that need steam for heating and are largely of the electrode water resistance type; i. e., they generate steam by the passage of high voltage current between electrodes immersed in water, which is thus heated to steaming temperature. Much success has attended the installation of electric boilers in these countries because they supplied a ready and economical substitute for scarce and expensive fuel.

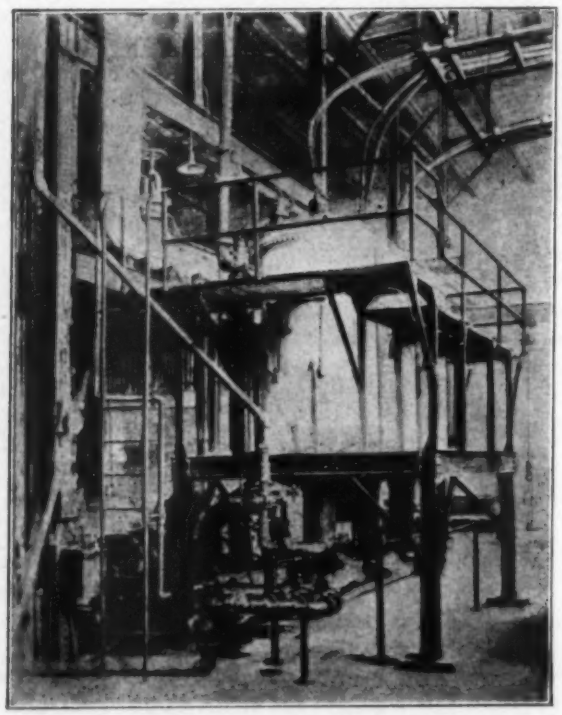


Fig. 1.
Belge-Canadian P. & P. Co., Shawinigan Falls, P. Q., normal power input 18,000 kw., maximum, 22,000 kw., at 6,600 volts, 3 phase, working pressure 135 pounds. Floor space occupied approximately 12x25 feet.

Little had been done in America along these lines until F. T. Kaelin, of Montreal, took up the development of an apparatus that would be simple, low in first cost, and reliable in operation, with the ultimate purpose of utilizing the surplus hydroelectric power available. The results of his exhaustive experiments have justified the time and expense involved. The illustrations shown at the end of this paper are concrete evidence of this fact. During the same period F. A. Lidbury and F. A. Stamps were experimenting with a low-voltage, small capacity generator, the results with which the embodied in a paper read before the American Electrochemical Society last fall.** It is not known to the author whether they have proceeded further with the development of their apparatus.

Various projects for employing direct or alternating current resistors passing through the tubes of a tubular boiler have been proposed, but on account of the great first cost and complexity of control, have apparently not progressed much beyond the proposal stage. This type has the advantage of being able to use either alternating or direct current, but except in isolated cases this consideration is more than offset by the disadvantages previously mentioned. We shall not refer again to this type, but confine ourselves exclusively to the water resistance of electrode generator.

Having thus briefly touched on the progress of development of the electric generation of steam, we will go on to discuss the principles underlying the conversion of electric energy into steam.

Principles

In the electric steam generator all the energy of the current is converted into heat energy by the passage of the current through water resistance, the whole process being governed by the principles of Ohm's Law, which simply states the relations of voltage, current and resistance. When current flows against resistance, energy is dissipated in the form

*F. T. Kaelin—"Generation of Steam by Electricity," Eng. Institute of Canada, Jan. 19, 1922.
"Electric Steam Generation in Switzerland," Power, Vol. 52, p. 596.
"Making Steam Electrically in France," Power, Vol. 53, p. 404.
"Electric Heating of Steam Boilers in Sweden," Power, Vol. 53, p. 746.
"Some Types of Electric Steam Boilers," F. Holmgren, Trans. Iron Institute of Sweden.

**F. A. Lidbury and F. A. Stamps, "An Electric Steam Generator for Low Voltage," Trans. Amer. Electrochem. Soc. Oct., 1921.

of heat. One kilowatt hour is equivalent to 3412 B.t.u. Disregarding losses for the present, this amount of heat represents that required to evaporate 2.97 pounds of water at 32° F. into steam at 212° F. (or 3412 ÷ 1147 equals 2.97 pounds). If we consider steam at 150 lbs. gauge, feed water temperature 150° F., the heat to be supplied will be 1193—(150—32)= 1075 B.t.u. per pound of steam. One k.w.h., therefore, will evaporate 3412÷1075 or 3.17 pounds.

The efficiency of the apparatus is high. The losses are those due to heat carried away by the bleed water and to radiation from the boiler; but since both are very small compared to steam output, even for small uninsulated generators, the efficiency may be taken as 95 per cent. For the larger units, with proper lagging, the efficiency may safely be taken as 98 per cent. Using this figure, the quantities given in the preceding paragraph should be changed to correspond, viz.:

(a) Feed water at 32° F.—1 k.w.h. is equivalent to 2.90 pounds of steam.

(b) Feed water at 150° F.—1 k.w.h. is equivalent to 3.10 pounds of steam.

Under average conditions one pound of soft coal of about 12,000 B.t.u. evaporates 8 pounds of water; one ton of 2,000 lbs. evaporates 16,000 pounds of water. The electric energy required to evaporate the same amount (16,000 lbs.) is equal to 16,000 ÷3.10=5,161 k.w.h.=215 k.w. days=0.59 k.w. year= 0.8 h.p. year. In other words, 215 k.w. in an electric steam generator is equal to one ton of coal per day burned under average conditions of boiler efficiencies.

The relation between the capacities of the coal-fired boiler and the electric steam generator may be expressed as follows: One b.h.p. is defined as equivalent to 34½ lbs. of water evaporated from and at 212° F. per hour and represents 33,479 B.t.u. per hour. One k.w.h. at 98 per cent efficiency equals 3,344 B.t.u. per hour. These figures are almost exactly in the ratio of 10 to 1, therefore,

(c) 10 k.w.h. in a steam generator=1 b.h.p., or

(d) 13½ e.p.h. hours in a steam generator=1 b.h.p.

Design

The design of an electric steam generator involves fundamental consideration of the length of path of the current through the water. For a given voltage this distance is determined by the composition of the feed water,—the amount of salts and impurities contained therein, etc. No hard and fast rule can be laid down for the relations governing this distance between electrodes before the feed water conditions are known. In general, it may be stated that any water that is suitable for use in the ordinary boiler can be used in the electric generator, with one important difference; that is, it is neither necessary nor desirable to add chemicals to the feed. Impurities to a reasonable amount and scale are removed by bleeding a small percentage of the input constantly, this amount varying from 2 per cent when condensate is largely used, to a maximum of 20 per cent when cold raw water constitutes the feed. It might be objected that when so large a percentage of the feed water is drawn from the apparatus the thermal losses would be large. That this is not so is apparent from the fact that the bleed water is drawn from the bottom of the vertical shell and near the feed inlet, hence the discharged waste is only slightly above the temperature of the incoming supply.

Constant conditions are attained in the water by the bleeding referred to above. It has been determined through experience that the resistance can thus be controlled over a considerable range according to the amount bled.

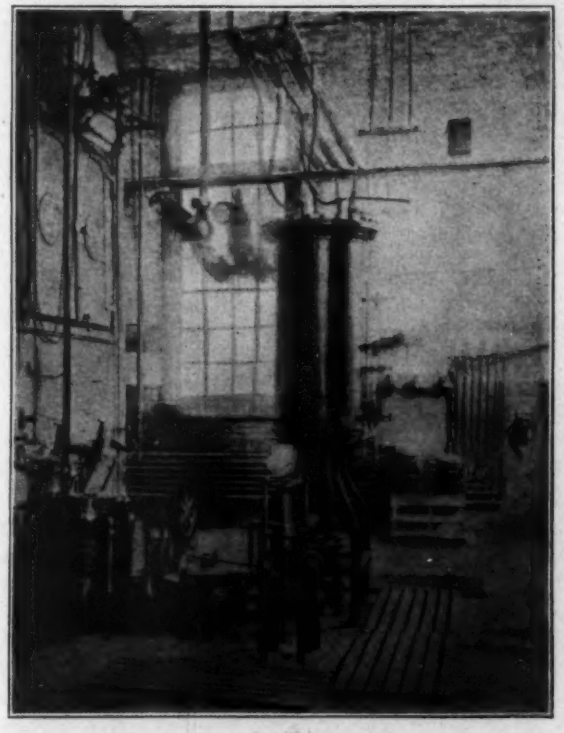


Fig. 2.
Wayagamack Pulp & Paper Co., Three Rivers, P. Q., 5,000 kw., 2,200 v., 3 phase, single tank. Working pressure 150 pounds. Floor space occupied about 6x12 feet

In order to maintain a constant steam pressure the generation of steam has to follow the demand closely, which requires regulation of power input to steam demand. This is accomplished by varying the resistance, either by changing height of water, by changing amount of water fed or by suitably adjusting the amount of bleed water.

Pure water has a high order of resistivity with a negative co-efficient of resistance, so that it is practicable to apply voltages up to 12,000 directly on the boiler. The economy of using the higher voltages without the necessity of step-down transformers is readily apparent, as usually transformers would cost

more than the generator itself. Less copper is required also.

In most cases three-phase alternating current will be used. The economical arrangement of the generator will then be to use a single tank with three electrodes and a neutral on voltages up to about 2,200. The electrodes are connected directly to the line; the neutral point and the tank are grounded. For large units and voltages higher than 2,200, a three-tank arrangement is best. In this case, each tank has one electrode immersed in it and connected to the line; the three shells are connected together and grounded, thus forming the neutral point of the star connection.

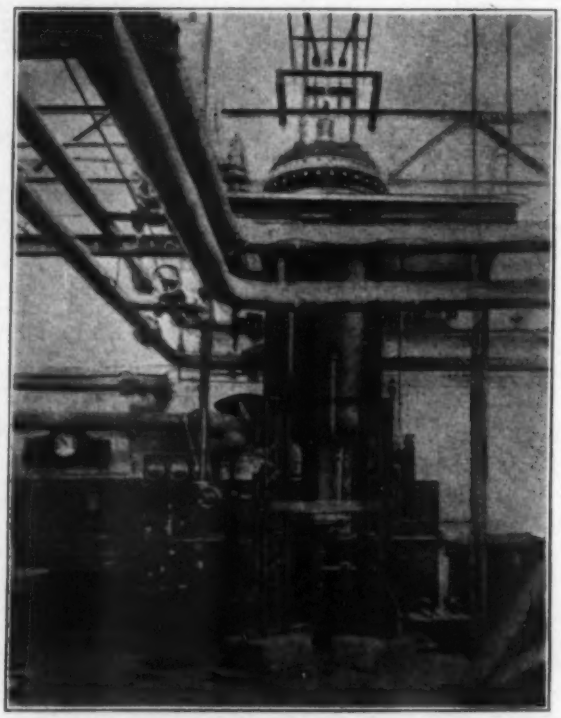


Fig. 3.
Canadian Electro Products Co., Shawinigan Falls, P. Q., 1,300 kw., 2,200 v., 3 phase, single tank. Working pressure 125 pounds. Floor space about 5x8 feet.

Such are the fundamentals of the water resistance type of boiler. Outstanding features are its simplicity, compactness, easy control and low first cost, which is often the deciding factor, particularly for a temporary installation.

Economic Field of the Electric Steam Generator

The electric steam generator was developed in America to consume off-peak and surplus power of a large hydro-electric system. The first installation was made in a Canadian paper mill in a region where coal was costing about $8.50 a ton. This initial generator was designed to consume 15,000 k.w., but has since been run at 18,000 k.w. continuously, with a steam production of 55,800 pounds per hour at 135 pounds pressure. Other installations have been made since then, until now the total capacity of this type installed or building is about 100,000 k.w. By far the greater number of these generators are found in the paper and pulp mills of New York and eastern Canada, where water-power has been quite widely developed and where coal costs are rather high. It is pertinent to the subject to examine the probable economic field for apparatus of this description, not of necessity confining the inquiry to the pulp and paper industries,—for the facts deduced should be universal in their application,—but surveying the field of steam users in general.

Three divisions of the economic field of the electric steam generator are suggested:

I. As a temporary consumer of firm power during periods of industrial slackness.

II. As an off-peak or surplus power load.

III. As a replacement of existing plant or as alternative when new plant is projected.

I. As a temporary consumer of firm power during the present period of subnormal business the electric steam generator has filled a genuine want. Large consumers of electric power, such as many paper mills, commonly buy blocks of power on a firm contract in amount necessary to cover their normal requirements. When the condition of business necessitates a reduced scale of operation a portion of this power is not being used, although paid for. Regardless of the costs of fuel and power, any device with reasonable first cost and low labor and maintenance charges, which will convert this power into steam and save the cost of an equivalent amount of coal, is bound to find a place for itself. Here it is not a question of the one method being cheaper than the other, but of saving good dollars that are being paid out for fuel when there is at hand a surplus of electric energy, paid for whether used or not, that can be used as a substitute for coal. Under these conditions an electric steam generator will pay for itself in a short time and save money thereafter.

For example, assume coal costs $5 per ton and 50 tons are burned per day or a total cost for fuel only of $250 per day. An electric steam generator of equivalent capacity will consume approximately 10,000 k.w. and will cost about $15,000 installed. Saving $250 per day, it will take two months to pay for the installation of the generator, and if reduced labor costs were taken into consideration this showing would be even better.

II. As an off-peak, week-end, or surplus power load, the electric steam generator will find favor with power users and central stations. In general it might be stated that when the load factor of a system falls below 90 per cent there is a possible application. The importance of good load factor is widely recognized. By granting special rates for blocks of power during the night and at week-ends, central stations may utilize a greater percentage of their available capacity and secure additional revenue, while the cus-

tomer may benefit by installing a steam generator to use this power.

An interesting project along these lines is being put forward. A consumer of power has a clause in his contract relating to demand which automatically establishes the demand at the higher figure when the stipulated figure in the contract is exceeded for a period of one minute or longer. To increase the load factor of the system, a steam generator will be installed to consume surplus power. To insure against exceeding the demand, a semi-automatic control will be provided, which will increase or decrease the load on the generator according to the load demand of the system as a whole. The difference between the power paid for and the power consumed by the system other than the generator will represent the saving effected in the fuel bill for this plant.

As a surplus load, very much the same reasoning may be applied as is given under heading I. An instance of this is a generator 20,000 k.w. capacity, which was put down by a central station in a paper mill to consume surplus energy. Steam was sold at a saving to the customer amounting to 40 per cent of his costs with coal boilers; and the central station amortized the installation in eight weeks.

III. As a replacement of existing plant or as alternative when new plant is projected, the electric steam generator is to be considered only when fuel is expensive and electric power is abundant and cheap.

Under headings I. and II., the absolute relative costs of the two methods were not considered, but in this case they will be taken up.

A comparison of a coal burning installation and electric steam generators of equivalent capacity for a typical paper mill will perhaps be the best method of bringing out the relative costs. The items to be considered may be tabulated and brief comment made before detailed figures are shown.

Operating Expenses

1. Cost of coal per ton or of power per e.h.p. year.
2. Labor.
3. Maintenance.

Fixed Charges

1. Interest on investment, depreciation, insurance and taxes.
5. Overhead.

1. Cost of coal will be taken f.o.b. plant and an average boiler and furnace efficiency of 65 per cent assumed.

Labor

2. The only labor required to operate the electric steam generator is an attendant to operate the bleed valve occasionally, to vary the feed input according to steam demand and maintain electrical balance on the line when three-phase multiple tank units are used. His duties are few. One man can attend to a single unit of any capacity or for plural installation up to 7,500 or 10,000 b.h.p. At one plant now being put down, where 50,000 k.w. or 5,000 b.h.p. in two three-phase, three tank generators will be used, the operation will be arranged for one man who will not need to stir from his chair but will have every instrument, switch and valve within easy reach. This lone attendant may be contrasted with the large squad necessary for the average boiler plant of like capacity.

3. The item of maintenance and supplies is trifling for the electric generator. The only parts of the apparatus subject to wear are the electrode, which may be replaced annually at nominal cost, and, of course, the valves, but these are to be considered in any case. Since the highest temperature is that of the steam, the troubles met with in flame-heated boilers are not encountered, such as burning out of refractories and falling arches, cleaning of flues, melting of grate bars, wearing of stoker parts or if coal handling equipment is used, repairs to this machinery.

4. Interest, depreciation, insurance and taxes will be combined and will be taken as 14 per cent for both types of apparatus. The original investment in apparatus and buildings will be very much lower for the electric generator than for the usual boiler plant. The size of building particularly will be small for the former. In a number of cases it will be possible to place the generator in a corner of the room where the steam-consuming apparatus is installed, doing away with long pipe lines and with the use of an extra attendant for operating the generator.

For a typical comparison we will consider a boiler plant consisting of eight 400 b.h.p. stoker-fired units, average boiler and furnace efficiency 65 per cent; and an electric steam generator of the same total capacity in 2 equal units. Both plants will operate three 8-hour shifts. Coal will cost $10 per ton f.o.b. the plant; electric power at $15 per e.h.p. year will be used.

I. Coal Fired Plant.

1. Fuel cost—60,000 tons per year×$10=$600,000.
2. Labor:***

No. of Men and Duties	Rate	Total Cost Per Day	
1 boiler house foreman on each shift	.90	$21.60	
1 water tender each shift.	.65	15.60	
1 foreman of coal handling	.65	5.85	
2 coal handlers on each shift	.55	26.40	
1 ash handler on each shift	.55	13.20	
3 firemen on each shift	.65	46.80	
2 helpers on each shift	.55	26.40	
Total per day		$155.85	
Yearly cost 365×$155.85			$56.885.25
3. Maintenance			8,000.00

***Loren L. Hebberd, M. C., Technical Association Papers, Fourth Series.

4. Interest on investment, depreciation, insurance and taxes—
The total investment will run in the neighborhood of $250,000, made up as follows:

Building and stack.	$50,000.00	
Boilers and auxiliaries @ $60.....	192,000.00	
Coal trestle, etc. ..	8,000.00	
	$250,000.00	
14 per cent of $250,000		35,000.00
Total yearly charges		$699,885.25

II. Electric Steam Generator Plant.

1. Electric power at $15 per e.h.p. year.
One b.h.p. requires 13.4 e.h.p. 3200×13.4×$15 ..... $643,000.00

2. Labor:
1 attendant, 3 shifts@65c. yearly, 24×.65×365 ..... 5,256.00

3. Maintenance 2,000.00

4. Interest, depreciation, taxes and insurance.
The total investment will amount to $53,000, made up as follows:

Steam generators, including feed pump, hot well and accessories	$41,000.00	
Building	12,000.00	
Total investment ..	$53,000.00	
14 per cent of $53,000.		7,420.00
Total yearly charge		$657,676.00

Summary:

Total yearly for coal plant	$699,885.25
Total yearly for electric plant	657,676.00
Saving yearly in favor of electric steam generator	$42,219.25

Conclusions

The use of electricity will save the cost of the installation in a little over a year.

From the facts presented in the foregoing, we may briefly recapitulate the present conclusions.

The outstanding characteristics of the electric steam generator may be summed up:

1. This type of steam generating apparatus is the cheapest method of converting electric energy into heat.

2. For the power consumer the generator provides a means of utilizing idle power and thus improving the load factor.

3. The power company is able to sell its surplus power for the generation of steam. This is made possible mainly by the comparatively low first cost of the electric steam generator.

4. By the utilization of much idle power the conservation of our natural resources is furthered.

5. The generator may be installed in a very small space close to where steam is required. It is simple, reliable, easily controlled, safe in operation, and requires only the attention of an ordinary skilled man.

A Steel Frame Skid

A NEW type of steel frame skid is being marketed by a prominent truck manufacturer. The skid consists of a steel frame, malleable iron legs and yellow pine planks riveted and bolted. There are five distinct advantages which make this type of skid valuable. Its foundation is made of heavy angle iron which prevents the platform from spreading, sagging, buckling or warping. The planking is made of North Carolina pine with adequate dimensions for maximum wear and efficient service. Through each plank pass four countersunk bolts, secured to the angles by nuts and lock washers.

The shoes are of malleable iron, 1½ inches wide which maintain the skid at the proper height from the floor—permanently. As the legs are the points of greatest strain, each is held to the frame by two rivets, and by two bolts that pass entirely through both frame and planking, thereby preventing the platform from wobbling. Another advantage is that the legs are placed at extreme ends in such a way as to give maximum road clearance between them. This gives the greatest possible advantage to the lift truck when approaching or leaving a grade; such as entering or leaving freight cars.

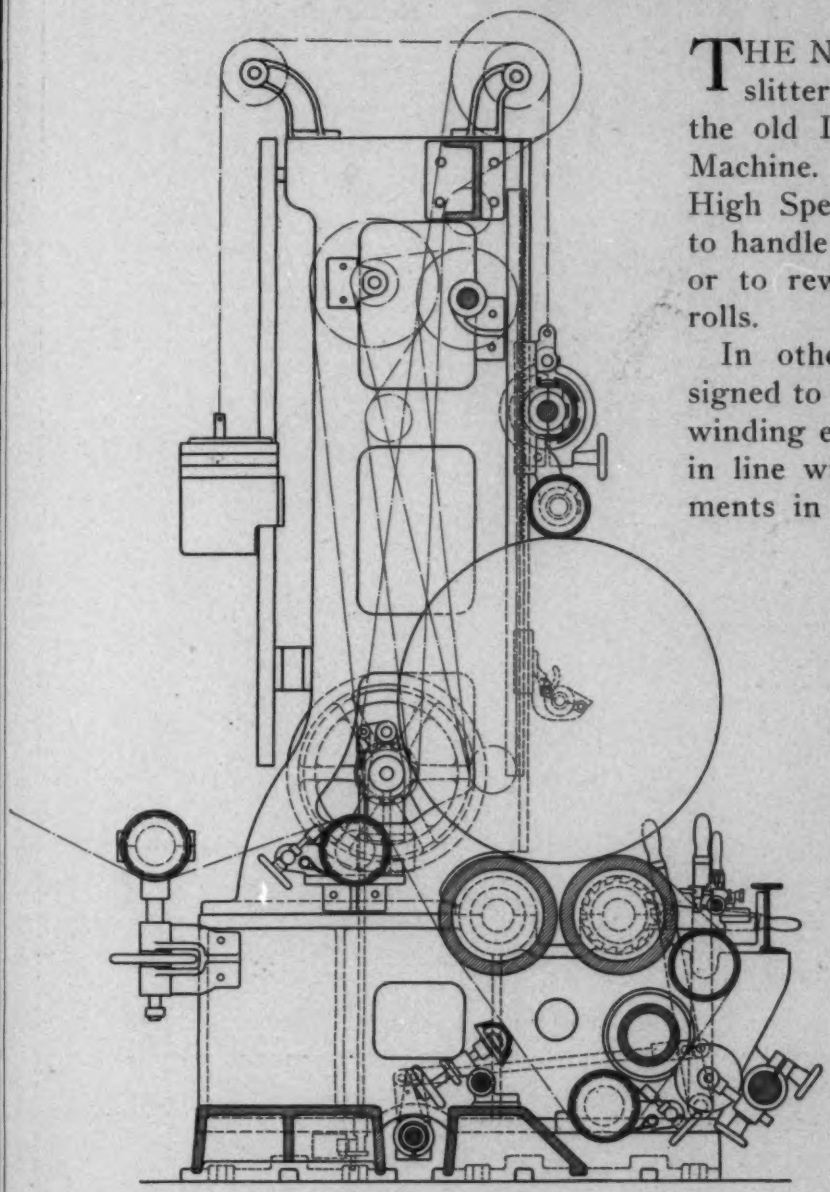
These skids can be shipped knocked down and bundled, thereby saving to the extent of getting Class 3 freight rates. They can be put together readily by one man with a monkey-wrench.

A Comment

ATTENTION was called to the fact that the table which appeared on page 249 of the May issue of THE PAPER INDUSTRY, in an article "Weights and Volumes of Pulp Stock" by F. H. Shiland, should have been credited to Mr. A. H. White, Chief Engineer of the International Paper Company, who, it is said, copyrighted one apparently like it some twelve years ago.

Mr. Shiland graciously suggests that, in all fairness to Mr. White, since he had previously copyrighted a similar table more than a decade ago, credit should also be given to him for same.

The Langston "DA" Slitter and Winder or Rewinder



THE New Langston "D A" slitter and winder replaces the old Langston "Type D" Machine. It is designed for High Speed Paper Machines, to handle wide webs of paper or to rewind large diameter rolls.

In other words it is designed to keep the slitting and winding end of paper making in line with present developments in the paper industry.

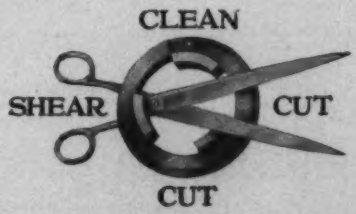
Specifications

122-inch machine weighs 33,000 pounds. The main winding drums are 14" in diameter and are bored inside and turned so they are in perfect balance and are mounted in Hyatt Roller bearings. The idler rolls are hollow and 8½" in diameter and mounted on S. K. F. Ball Bearings. The driven cutter shaft is hollow and 7¼" in diameter and mounted on S. K. F. Ball Bearings.

The slitting is done by a combination of the Standard Langston Cutter (patented Jan. 28, 1902) mounted on the driven shaft and the Standard Keogel Cutter.

The rack bars, for controlling pressure bar, are stationary, thus reducing overhead clearance.

Samuel M. Langston Co.
Camden, N. J.

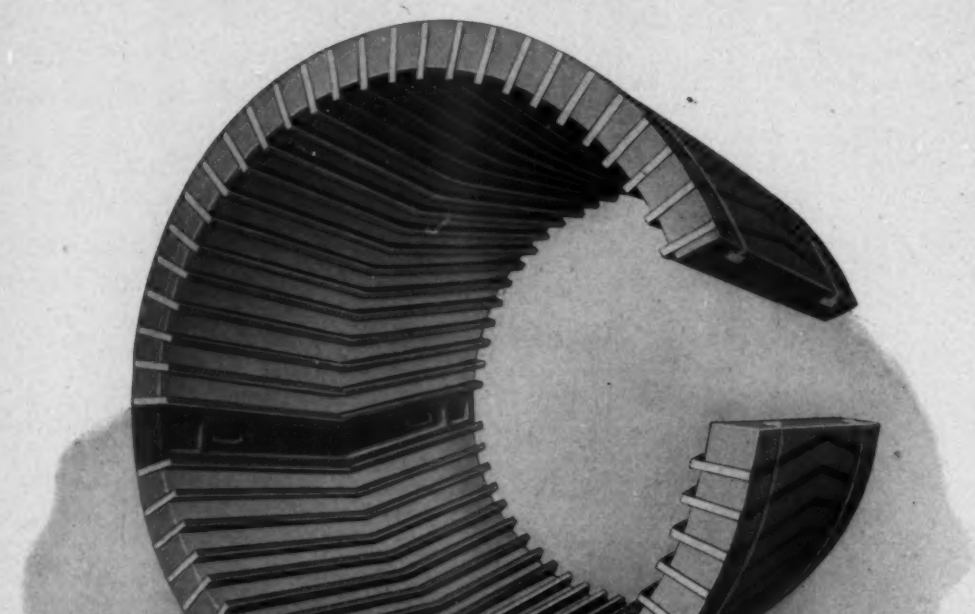


AGENTS

T. W. & C. B. Sheridan Co., London, England

Toronto Type Foundry Co., Toronto, Canada

SHARTLE
Bulldog Shell Filling



Patent has been applied for on this filling.
If granted, all infringements will be vigorously prosecuted

Will not tear out
Is a wood and steel filling
Saves labor in installation
Has 15 per cent more knives than a cast filling

Always fits
Wears evenly
Made for any jordan
Will handle all kinds of stock
Made in Bronze, Ampco or Steel

Ship us your shell fillings and we will make them into Bulldog fillings

The **Shartle Bros. Machine Co., Middletown, Ohio**

Joint Convention of the American Pulp and Paper Mill Superintendents Association with the Cost Association of the Paper Industry

Held on June 1, 2, and 3, 1922, at Kalamazoo, Michigan

THERE are none can say but that the big, annual Convention of the American Pulp and Paper Mill Superintendents' Association held jointly with the Cost Association of the Paper Industry in Kalamazoo, Michigan, June 1, 2 and 3, was a huge and crowning success. The great little city, known the world over as one of the largest paper making centers, exhibited itself wonderfully in a genuine and cordial spirit of hospitality. Much credit is due to Mr. John H. O'Connell, president of the American Pulp and Paper Mill. Superintendents' Association, his assistants and members of the arrangement committee of both associations for having prepared the details so thoroughly that little or no friction was experienced in the conduct of the entire Convention.

Nearly three hundred registered during the first two days at the headquarters of the superintendents in the Burdick Hotel, and about fifty representative cost accountants registered at the headquarters of the Cost Association of the Paper Industry at the Park American Hotel.

During the forenoon of the first two days, the superintendents and cost accountants held separate meetings in the Burdick Hotel and the Kalamazoo Vegetable Parchment Company's New Community House and met in the latter place at one o'clock for joint luncheons. These luncheons were followed by combined meetings of both Associations where many excellent, co-operative ideas were exchanged between the representatives of these two important factors in the paper industry.

On calling the Convention of superintendents to order in the Burdick Hotel Ball Room, at 10:30 o'clock on Thursday morning, President O'Connell said:

"We are again meeting in international convention and in the wisdom of the executive committee they chose this city of Kalamazoo for our deliberations. That their choice was an excellent one it is the intention of the arrangement committee, and in fact every member of the Michigan division, to thoroughly prove to you. We feel very confident of your approval of our efforts to entertain you while in the city.

"In choosing Kalamazoo, the executive committee was prompted by the fact that we have never held our convention in a papermaking town. As Kalamazoo is ideally located and is perhaps the largest paper making center in the world, the committee felt very confident that those that came here could derive more direct benefit by a visit to any or all the mills of the valley and thus see in actual practice how the other fellow makes paper.

"Right here let me add that we have the endorsement and hearty co-operation of every paper mill manager and executive in the community. They have indorsed our convention and assured us that we are at liberty to visit their mills as often as we choose during the stay here.

"We are also honored this year by having with us the Cost Accountants of our great industry, and at our joint meetings each afternoon, subjects of great interest to each superintendent and cost accountant are to be discussed. From these meetings we all should get information that will be of great assistance in the future."

President O'Connell then referred to the programs prepared for the various sessions, at the same time urging all visitors to attend as many of the meetings as possible; he added: "I have no fear of contradiction in saying that this is to be the most successful gathering of presidents, mill managers, cost accountants, superintendents and in fact representatives from every branch of our great industry from all parts of the United States and Canada ever held.

President O'Connell called attention to the fact that much important business is to be transacted here, including election of officers; changes in the constitution; the question of a joint meeting with the Technical Association this fall in Detroit; standardization of paper felts; closer relationship with the American Pulp & Paper Association.

The speaker was particularly strong in his plea for a strenuous membership campaign and the establishment of divisions in Massachusetts, Pennsylvania, Eastern Canada, and on the Pacific Coast. He further recommended the acceptance of the invitation extended for a joint meeting with the Technical association, and the appointment of a general committee empowered to complete all arrangements for this meeting.

Charles S. Campbell, president of the Chamber of Commerce, followed immediately, extending the visitors cordial welcome to the city.

The superintendents then settled down to the consideration of technical problems. Four papers of such nature were read. N. M. Brisbois, president of the Michigan division of superintendents, read a paper on "Lining of Sulphate Digesters with Brick." This paper was prepared by P. C. Austin, of the Bathurst Lumber Co., Bathurst, N. B. The other articles were "Handling of Wood Room Equipment," by F. J. Carroll; "Some Aspects of Engine Sizing," by E. J. Turner and "Handling of Old Paper Stock," by E. G. Milham, Chemist of the Bryant Paper Co. Open discussions were permitted on any point introduced.

Meeting of the Cost Accountants

The meeting of the Cost Association was featured by the presentation of two reports, read by Secretary Thomas J. Burke, of New York City. One was the Report of the Committee on Beater Furnish, prepared by H. F. Miller, of the American Writing Paper Co., and the second was the Report of the Committee on Depreciation, prepared by Edgar S. Catlin.

Joint Luncheon at the Community House

An energetic transportation committee, headed by Jacob Kuss, of the Allied Paper Mills, had rounded up a host of automobiles for the accommodation of all, each car bearing the banner "This car for you while in Kazoo." The superintendents were taken from the Burdick, immediately following their morning session, to the New Community House of the Kalamazoo Vegetable Parchment Co., where the joint luncheons with the cost accountants were held. The visitors were greatly impressed with the ideal situation this place afforded to hold such a meeting. During the luncheon, a delightful entertainment was provided by the Mandolin Club of the Central High School, and Miss Alberta Putney, a pupil of the same school.

Welcomed by Kindleberger

Jacob Kindleberger, president of the Kalamazoo Vegetable Parchment Co., welcomed the members of the two organizations to the community house and bespoke for them an enjoyably stay in Kalamazoo. Mr. Kindleberger's address is published on another page of this issue.

On a motion of J. A. Reilly, manager cost and inventory department of American Writing Paper Co., a vote of thanks was extended Mr. Kindleberger by the convention.

Dr. Baker Talks

Dr. Hugh P. Baker, secretary of the American Pulp and Paper association, spoke on "Association Activities in the

PICTURE taken of the Joint Meeting of the American Pulp and Paper Mill Superintendents' Association and the Cost Association of the Paper Industry, in front of the Kalamazoo Vegetable Parchment Company's New Community House, on Friday, June 2, 1922.

Paper Industry." He outlined the formation of various associations and their value, if properly conducted.

"If I am not mistaken, the American paper industry faces a real fight within the next ten years to defend its own domestic market," he said. "For that reason we should encourage export trade as much as possible. We are woefully ignorant regarding the paper industry in Europe. It would pay us to maintain a man in Europe just to keep us posted on all developments there."

A paper on "An Executive's Viewpoint on the subject of Co-operation Between Superintendents and Cost Departments," written by G. A. Galliver, president of the American Writing Paper Co., was read by Dr. Rindfuss, of the same company. It was an interesting technical document, as was C. Oliver Wellington's paper on "How Cost Systems Help Superintendents."

F. M. Hodge Provokes Mirth

F. M. Hodge, president of the Kalamazoo Paper Co., was the last speaker of the afternoon session. His talk was along a humorous vein and he succeeded in sending everybody away in a merry mood.

Assigned the subject "Cost Accounting as Relating to Superintendents" he likened the superintendent to the architect and contractor, the cost accountant to the estimator. He declared there can be no controversy between the two, if they work together correctly.

S. L. Bush, president of the Cost Association of the Paper Industry, confined at his home in Holyoke, by illness, wired his best wishes for the success of the convention. A reply message was sent by the convention in session.

Thursday Evening Banquet

Covers for four hundred and fifty guests were laid in the main auditorium of the Community House, and the visitors and ladies, the latter numbering nearly a hundred, filled the hall and enjoyed the banquet and entertainment given by W. J. Lawrence, vice-president and general manager of the Western Paper Makers' Chemical Co. Gay, old fashioned bouquets adorned the tables. The service was generally satisfactory and the host can rest assured that his entertainment was in every way enjoyed.

The entertainment features were furnished by the Gibson Melody Maids. They offered a varied program of vocal and instrumental numbers and dancing. The boys enjoyed the community singing immensely. Miss Mildred Tanis read two selections.

It was well past 9 when President J. H. O'Connell introduced Claude E. Nicely, president of the LaSalle Paper Co., South Bend, as toastmaster of the evening.

Address of Hon. Charles F. Moore

Hon. Charles F. Moore, of New York city, spoke on "The Average Man." His introductory remarks were highly amusing, particularly his jab at Congresman Kelley, when he said: "We talk best on those subjects we know the least about. That is the reason the Congressional Record is so much more voluminous than Solomon's Proverbs."

He said that we pay too much attention to the unusual things of life, passing by the usual. He deplored this disposition to overlook the plain, average people. He declared the press and the public are equally to blame for this condition, the press creating the demand, but that the people created the literature. His tribute to the unknown soldier brought the added statement "there are unknown soldiers and heroes in every field of activity."

False standards were attacked, also the failure of people to live average lives and to do the average things of life.

"In commercial life it is particularly true that successes only are attributed to those who accumulate far beyond the average," he said. "It is often the vulgar display that makes for class distinction and dissatisfaction. The gilded fool is our most dangerous citizen."

Particular praise was accorded the public school system, whereby every child in the country was given an equal chance to secure an education. Judge Moore urged care in the admission of foreigners, remarking "the United States is so often referred to as the asylum for oppressed peoples. I do not want to see it made the garbage can of the world."

Hon. Patrick H. Kelley Speaks

Hon. Patrick H. Kelley, having been instructed by the toastmaster that those present wanted to know what the Government intended to do for the paper business in the way of tariff legislation, stated that he was not well enough posted on the needs of the paper industry to answer the question exactly.

"There ought not to be so great a delay in the passage of the tariff bill and settling business to a definite status," he said. "The house passed the tariff bill in July, 1921. It contains 3,000 items of clauses. After ten months work the senate has disposed of 27 of these clauses. Progressing at that rate the new tariff law will become effective sometime in 1946."

Congressman Kelley further considered questions of expenditures and the tariff, saying in part: "The relation of our people to their government is of the most vital importance. One of the greatest dangers we confront today is that of excessive expenditures. You can't take too great a portion of the earnings of any people without creating distrust in the government. While our taxes are heavy, there are nations in Europe that collect six months income out of every 12 from their people. You can't go on taking half the earnings of a people and be sure the government will stand. The greatest problem of the world is economic. Until we can reduce taxes, governments are not safe."

The speaker then reviewed the relative cost of government, ten years ago and today, stating that while formerly it used to run a billion dollars a year, now it is between three billion and four billion.

"It is hard to reduce," he added, "most everybody's idea of economy being to take from the other fellow." He urged everyone to hold up for a while, so the government can get by.

The consideration of tariff legislation brought forward references to the dilatory tactics practiced by the United States. He stamped "unlimited discussion" privileges as one of the real dangers, declaring that business is simply marking time, while the senate abuses this time privilege.

"One senator determined that a law shall not pass can hinder legislation," he said. "Six are a real menace and 20 senators well organized, can effectually block the passage of any law, by just talking it to death. Nearly every week now the senate tries the Newberry case, just as a diversion. It is time for this talk to stop, if big business is to go forward," adding, "you people can stop it."

Before the assembled company were allowed to depart, President Jacob Kindelberger, of the Kalamazoo Vegetable Parchment Co., presented each lady guest with a souvenir.

Friday's Sessions

The Friday morning session of the Superintendents' Association was called to order by President O'Connell at ten o'clock and the following papers were read and discussed: "The Modern Steam Boiler," by H. E. Wallis; "Freeness Control in Ground Wood Mill," by E. M. Williams; "Latest Development of Coating Mill Machinery," by W. H. Waldron; short talks by Dr. Hugh P. Baker and Hon. Charles F. Moore; "Power Transmission in the Paper Mill," by G. T. Vanderhoef, and "Underfed Stoker in Paper Mill Work," by F. A. DeBoos.

At the meeting of the Cost Association of the Paper Industry, the paper, "A Simple Cost System for One or Two Machine Mill," by Paul Koenig, was read and discussed. This was followed by a general discussion.

The joint luncheon was again held, and the afternoon meeting was opened with short talks by Mr. Felix Pagenstecher, president of the Bryant Paper Co., and Mr. Fred Sutherland, Secretary of the Sutherland Paper Co. Mr. A. B. Thomas, manager of the Eddy Paper Co., read a paper on "Relation of Employer to Employee." This was followed by an address by Mr. Joseph Slater, superintendent of the Escanaba Pulp and Paper Co., on "Co-operation Between Superintendents and Cost Accountants." Ex-president, Fred C. Boyce, superintendent of the Wausau Paper Mills, also spoke on the same subject. "How Superintendents Are Benefited by Cost Reports Based on Accurate Manufacturing Data," was the subject of the next paper by J. A. Reilly, manager of the Cost and Inventory Dept., of the A. W. P. Co. W. G. McNaughton, Secretary of TAPPI, then read a paper "Mill Costs from a Technical Man's Standpoint." The meeting closed with five minute addresses by C. A. Jasperson, C. A. Clarke and Ed. T. A. Coughlin.

This completed the deliberations of the Cost Association of the Paper Industry. Secretary Thomas J. Burke predicted that the following year would be one of expansion and general betterment of work done.

The dinner on Friday evening was a stag affair. There were no speeches and everybody went in for a noisy, rollicksome good time. The Famous Benson Sextet, of Chicago, and Fishers Exposition Orchestra, of Kalamazoo, furnished a jolly program of entertainment.

Election of Officers

The first order of business at the Superintendents' meeting on Saturday morning was the election of officers for the

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ensuing year. The following names were presented and the men unanimously elected:

President, John H. O'Connell, of Kalamazoo.

First vice-president, Nelson R. Davis, of S. D. Warren Co.

Second vice-president, Al. O. Rolfe, of Champion Coated Paper Co.

Third vice-president, Wm. A. Anderson, of Kinleith Paper Co., Ltd., St. Catherines, Ont.

Treasurer, Peter J. Massey, of W. F. Hall Printing Co.

Secretary, subject to appointment by president.

The report of the nominating committee was presented by Chairman N. M. Brisbois of the Sutherland Paper Company.

Mr. O'Connell thanked the convention for the confidence expressed in his administration, promising to continue in his efforts to build the organization stronger and better for the years to come. He was able to report that 26 new members have been enrolled during the convention in Kalamazoo and that the outlook for the future is very bright.

The following papers were then read and discussed: "Reclaiming Water from Condensate in Machine Room," by J. O. Ross; "Section Drive in Paper Mills," by S. A. Staege; "Some Observations on the De-Inking of Old Newspapers," by Sidney D. Wells; "Use of Starch in Paper Manufacturing," by W. A. Nivling. Mr. Thomas Harvey read an excellent report on "Standardization of Paper Mill Felts," prepared by his brother, G. H. Harvey, and considerable discussion ensued.

After luncheon being served in the New Burdick Hotel dining room, a short business meeting was held and final adjournment took place in time to allow the visitors to devote an hour or two to inspection of mills. Dinner was served at Gull Lake Hotel, LaBelle Resort, preceded and followed by boating, bathing and a general good time.

Next Semi-Annual Convention

It was decided to accept the invitation of the Technical Association of the Paper Industry to meet jointly with them in Detroit, Michigan, during the first week of next October. It was further rumored that expectations can be had that the next annual convention will be held at Holyoke, Mass., during June, of 1923.

Exhibits

The following firms had exhibits displayed in the rotunda and parlors of the Burdick Hotel: Taylor Wharton Iron & Steel Co., exhibiting beater roll and Jordan fillings; The Shartle Brothers Machine Co., exhibiting Shartle Bull Dog Shell Filling; The Permutit Co., exhibiting their water softening system; New Era Metal Products Co., exhibiting Durametallic packing; Armstrong Machine Works, exhibiting Inverted Bucket Steam Traps; Vibrating Machinery Co., Inc., exhibiting the "Clay-Hog." The Security Rubber & Belting Co., had an exhibit of their product at the Park American Hotel.

Attendance at Superintendents' Meeting

C. B. Andrews, Taylor-Wharton Iron & Steel Co.; C. K. Andrews, Itasca Paper Co.; R. T. Anderson, Patterson Parchment Paper & Megargee Paper Mills; W. A. Anderson, Kinlieth Mills; R. H. Alexander, Nakoosa-Edwards Mfg. Co.; H. K. Anderson, Dayton Glove Iron Works; H. A. Allison, A. A. Simons Son & Co.; Walter Ahlers, S. K. F. Industries; A. G. Adams, A. G. Adams & Co.

Alfred Bryant, Bryant Paper Co.; A. E. Bridge, Shartle Bros.; L. H. Breyfogle, Draper Bros. Co.; Barney Benson, Williams Gray Co.; A. M. Benzing, Champion Fibre Co.; N. M. Brisbois, Sutherland Paper Co.; A. Benson, Dyes Distributing Co.; H. P. Baughman, Simonds Mfg. Co.; R. A. Brenner, National Aniline & Chemical Co.; Wm. Battles, Franklin Board & Paper Co.; M. M. Beckett, Beckett Paper Co.; F. A. Beisel, Menasha Printing & Carton Co.; Frank Brewer, E-Z Opener Bag Co.; J. A. Bowers, Hammermill Paper Co.; M. V. Brooks, Miamasburg Paper Co.; Ray Brundage; F. L. Barstow, Falulah Paper Co.; Wm. Brydges, Defiance Paper Co.; W. E. B. Baker, York Haven Paper Co.; Charles Beebe, Union Calcium Co.; Geo. L. Bidwell, Warren Mfg. Co.; F. K. Becker, Bird Machine Co.; F. C. Boyce, Wausau Paper Mills; C. L. Berger, G. D. Jeneson Co.; Walter T. Bunce, Providence Dryslaters Co.; Henry E. Balsley, Hooven-Owens-Rentschler Co.; E. G. Brant, Stuart Adams Co.; R. C. Boggess, R. C. Sowers Mfg. Co.; Fred Booth, J. M. Huber Co.; Oscar Byers, Kalamazoo Vegetable Parchment Co., Glendale Division; H. Bing, Sandusky Foundry & Machinery Co.; D. D. Bowsher, N. P. Bowsher Co.; Hugh P. Baker, American Pulp & Paper Co.; Frank Boggs, Shuler, Benninghofen Co.

W. M. Carroll, Elite Paper Co.; O. B. Cohoon, B. F. Sturtevant Co.; C. J. Christianson, Fibre Making Process, Inc.; C. A. Croxen, Vacuum Oil Co.; A. S. Cosler, Texas Gulf Sulphur Co.; Fred Cherrie, Castle-Gottheil & Overton Co.; J. E. Cooney, Peninsular Paper Co.; James Cameron, Cameron Machine Co.; C. S. Campbell; F. B. Caton, Canadian Paper Co.; J. R. Carter, J. G. Terry Co.; J. L. Carey, J. L. Carey Co.; John Calder, Wrenn Paper Co.; John Cornell, Paper Mill & Wood Paper News; F. J. Carroll, Simonds Mfg. Co.; Chas. R. Chapman, superintendent Marion Paper Co.; E. T. A. Coughlin, Allied Paper Mills, Monarch Division; Ralph S. Clark, Kalamazoo Vegetable Parchment Co.

Theodore Dunn; John E. Daley, Port Huron Sulphite & Paper Co.; J. E. Dalton, Sears, Roebuck & Co.; Daniel Darvin, Provincial Mills; Nelson R. Davis, E. D. Warren Co.; W. L. Davis, Dells Pulp & Paper Co.; Peter F. Denner, Kalamazoo Paper Co.; Harry E. Dennie, Security Rubber & Belting Co.; T. E. Dial, Vacuum Oil Co.; Wm. H. Donaldson; A. Scott Dowd, PAPER INDUSTRY; F. W. Drake, Orr Felt & Blanket Co.; A. F. Driscoll, Smith Paper Co.; Peter W. Drysdale, Appleton Wire Works; A. F. Duernberger, Westinghouse Electric & Mfg. Co.; Frank J. Dunaway, Perkins Goodwin Co.; T. L. Dunbar, Stebbins Engineering Co.; A. C. Duncan, Western Paper Makers Chemical Co.; T. J. Dunn, Sturtevant Co.

Doc Edmunds, Wausau Paper Mills; T. L. Edmunds, Wausau Paper Mills; W. F. Ebbing, Ohio Knife Co.; H. D. Elliason, Newton Falls Paper Co.; Frank B. Eilers, Eilers Mill Supply Co.; Chas. L. Ellis, Downingtown Mfg. Co.; G. R. Ellis, Electro Bleaching Co.; Harry Eurich, MacSimbar Paper Co.

F. C. Farnsworth, Farnsworth Co.; L. G. Fell, Michigan Carton Co.; Otto Fisher, Bryant Paper Co.; A. C. Ford, A. A. Simons Son & Co.; Caleb B. Forsythe, mill agent; John F. Forsythe, Atterbury Bros.; C. A. Fourness, Kimberly Clark Co.; James Foxgrover, Western Paper Makers Chemical Co.; E. B. Fritz, PAPER INDUSTRY; W. B. Fulton, Fulton Engineering Co.

Frank S. Gardner, A. A. Simons Son & Co.; Geo. W. Gould, Plant-Theis & Gould Paper Co.; E. H. Gilman, Bryant Paper Co.; W. V. Grant, Provincial Paper Mills; W. S. Gregg, Gregg Pump Co.; E. H. Groff; R. M. Gue, Philadelphia Felt Co.; W. H. Guidotti Leavens-Guidotti Co.; Herman Gumbinski, Gumbinski Bros.

Howard P. Hall, Publicity; C. T. Hamill, Albany Felt Co.; C. L. Harter, Rex Paper Co.; Thos. Harvey, Gardner-Harvey Paper Co.; C. H. Helvey, Black-Clawson Co.; F. E. Hemmings, Carthage Machine Co.: Geo. Hendrick, Bryant Paper Co.; K. I. Herman, K. I. Herman Chemical Corp.; Jno. Herscher, Jno. Strange Paper Co.; Arthur Holbrook, Eng. Clay Sales Corp.; Jno. H. Hollingsworth, Oswego Falls Paper Co.; L. E. Houslee, Voorhees Rubber Mfg. Co.; J. R. Howard, Gardner-Harvey Paper Co.; K. Hugin, Western Paper Makers Chemical Co.; J. R. Hunter, Gottesman Co.; W. C. Hurley, H. Waterbury & Sons.

S. W. Jacobs, Electric Bleaching Gas Co.; E. S. Jenkins, M. W. Jenkins Sons; Nils R. Johaneson, Johaneson-Wales & Sparre Co.; Frank A. Johnson, King Paper Co.; O. B. Johnson, Hewitt Rubber Co.; J. B. Jones, Dyes Distributing Co.

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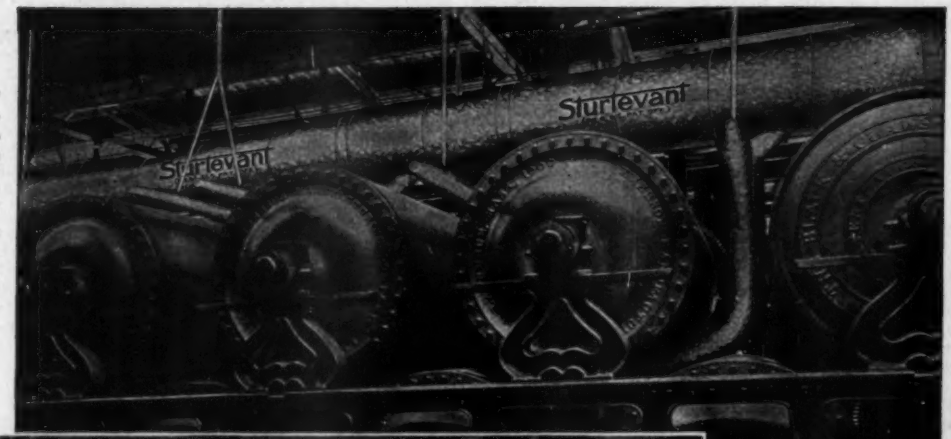
P. J. Lamoreaux, Marinette & Menominee Paper Co.; B. T. Larrabee, S. D. Warren & Co.; C. L. LaRoux, Nekoosa Edwards Paper Co.; Wm. J. Lawrence, Western Paper Makers Chemical Co.; Wm. Lee, Lockport Felt Co.; F. H. Lehecka, Taylor-Wharton Iron & Steel Co.; N. J. Lewis, Penn Paper Stock Co.; Herbert Lippitt, International Paper Co.; J. E. Loughead, Western Paper Mills Supply; Jno. R. Long, Tarentum Paper Mills; Michael Ludwig, Mead Pulp & Paper Co.; F. H. Lueders, Seybole Machine Co.; A. G. Lutz, Invincible Paper & Pulp Co.

C. W. McAlpin, LaSalle Paper Co.; B. T. McBain, Nekoosa Edwards Paper Co.; W. S. McClellan, P. H. Glatfelder Co.; C. G. McClellan, Kalamazoo Vegetable Parchment Co.; D. McDonald, Lawless Paper Co.; W. F. McGraw, Gutta Percha Rubber Mfg. Co.; A. M. McLintock, Union Sulphur Co.; James McMahon, Mathieson Alkali Works; C. J. McMahon, Robert Dollar Co.; W. G. McNaughton, secretary C. A. P. P. I.: A. McPhillips, R. J. Dowd Knife Works; Edw. McWiter, Provincial Paper Co.

E. R. MacLaren, Albany Felt Co.; Alex. MacVie, Pulp; A. M. Marcel, Brown Co.; Thos. F. Martin, Hammerslee Mfg.



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R. J. Quinn, Mathieson Alkali Works.

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T. H. Savery, Nash Engineering Co; H. Y. Saxon. Bird Machine Co.; H. F. Schenk; W. P. Schenk, Champion Coated Paper Co.; H. W. Server, Miami Paper Co.; E. W. Sharpless, Menasha Printing & Carton Co.; H. B. Sherwood, Permutit Co.; J. Stroeter, Vibrating Machine Co.; A. W. Simpson, DeGrass Paper Co.; Samuel Simpson, Allied Paper Mills; Arthur Sigel, M. Gotteman & Co.; J. Slater, Escanaba Paper Co.; A. G. Sleicher, E. J. Keller Co.; L. E. Smith, Nakoosa Edwards Paper Co.; E. A. Smith, Hill Clutch Co.; W. Merrit Smith, Philadelphia Paper Mfg. Co.; F. A. Smith, Mullen Bros. Paper Co.; Ralph M. Snell, Paper Makers Chemical Co.; B. F. Soffe, Permutit Co.; R. J. Sprang, Champion Fibre Co.; S. A. Staege, Westinghouse Electric Mfg. Co.; H. E. Stafford, Knowlton Oil Co.; A. C. Stepau, Roessler Hapslacker Chemical Co.; C. C. Stewart, Newton Falls Paper Co.; Fred W. Sutherland, Sutherland Paper Co.; W. H. Swanson, Forrest Products Laboratory.

A. A. Tanyane, Paper Trade Journal; J. A. Temple, Kalamazoo Sheet Metal Mfg. Co.; W. H. Theroux, Sandusky Foundry & Machine Co.; C. O. Thorn, Watervliet Paper Co.; Floyd Tifft; E. F. Troop, P. H. Glatfelder Co.; E. A. Turner, DuPont Co.

W. A. Uhl, F. C. Huyck Co.; C. R. Ulrich, Junkin Paper Mills; C. W. Ulrich, Wolverine Paper Co.

Jno. W. Van Alstyn, Peshtigo Fibre Co.; G. N. Van Derhof, Dodge Sales & Engineering Co.; L. R. Verdon, Western Paper Mills Supply; H. K. Vinton, Paper Trade Journal.

J. J. Wall, General Electric Co.; S. D. Wells, Forest Products Laboratory; L. V. Welsh, Union Screen Plate Co.; W. Weston, American Wringer Co.; Wm. H. Wightman, Lee Paper Co.; C. W. Whitehouse, Abitibi Paper & Power Co.; M. M. Whitman, Marathon Paper Co.; A. G. Wightman, Hawthorn Paper Co.; A. E. Wilcox, U. S. Rubber Co.; Robt. Williams, Williams Gray; F. M. Williams, Williams Apparatus Co.; W. J. Williams, Clarage Fan Co.; J. L. Williamson, Ross Engineering Co.; P. L. Wilson, Great Western Mfg. Co.; Lee Wilson, Morris Paper Mills; J. H. Wright, Wm. Cabble & Sons.

Emil Yahnke, Standard Paper Co.; C. E. Youngchild, Nakoosa Edwards Paper Co.

Jos Zelinske, McGillan-Asmuth Co.

Attendance at Cost Meeting

William Allan, Waste Paper Packing Co.; Jay T. Bachelder, Standard Paper Co.; John Balch, Horace P. Griffith & Co., C. P. A.; Harry D. Barney, Allied Paper Mills; Peter F. Bosker, Rex Paper Co.; R. F. Boutillier, Knowlton Bros.; Harry C. Bradford, Allied Paper Mills; Paul L. Broesamle, Allied Paper Mills; C. A. Brown, Great Western Paper Co.; F. L. Brown, Michigan Paper Co.; Thos. J. Burke, secretary-treasurer Cost Association of Paper Industry; Chas. H. Cashmore, Paterson Parchment Paper Co.; J. C. Carter, Kalamazoo Vegetable Parchment Co.; Harold F. Dewey, Lee Paper Co.; M. C. Dickoff, Marinette & Menominee Paper Co.; Edward J. Fitzgerald, Scott Paper Co.; J. Platt Glezen, Allied Paper Mills; Israel Gordon, Lee Paper Co.; R. W. Gowdy, The Hagar Straw Board & Paper Co.; Marvin A. Hart, MacSim Bar Paper Co.; R. P. Hill, Hammersley Mfg. Co.; S. A. Hummer, York Haven Paper Co.; H. F. Hummell, Sutherland Paper Co.; Jno. E. Hyde, S. D. Warren Co.; G. T. Ingling, Kalamazoo Paper Co.; C. A. Jasperson, Nekoosa Edwards Paper Co.; Paul Keonig, Marinette & Menominee Paper Co.; J. H. Kline, York Haven Paper Co.; Arthur W. Lewis, Michigan Carton Co.; D. J. McIlrae, Falls Mfg. Co.; Earle F. Metcalf, Standard Paper Co.; Edwin A. Meyer, Menasha Printing & Carton Co.; Allan B. Milham, Bryant Paper Co.; Elbert G. Milham, Bryant Paper Co.; P. V. Millard, Consolidated Water Power & Paper Co.; Ralph H. Morrill, Chemical Paper Mfg. Co.; Robert M. Mudgett, Strathmore Paper Co.; C. F. Niederman, Bechett Paper Co.; W. H. Oliver, Allied Paper Mills; Lawrence Ouelbett, Munising Paper Co.; J. A. Reilly, American Writing Paper Co.; R. E. Rindfuss, American Writing Paper Co.; Henry J. C. Rosenow, McGillan-Asmuth Paper Mills; L. N. Russell, Wolverine Paper Co.; D. C. Shaw, Jr., Tarentum Paper Mills; A. M. Van Houser, Marathon Paper Mills Co.; Robt. L. Wall, Standard Paper Co.; L. R. Wegner, MacSim Bar Paper Co.; C. O. Wellington, Scovell, Wellington & Co.

New York Salesmen Adopt Prayer

The New York members of the Salesmen's Association of the Paper Industry are not satisfied with the possession of a Chaplain, talented though Dr. Craig Stewart, the official clergyman of the Association, is. At their monthly luncheon at the Arkwright Club, with the biggest attendance yet held, they adopted a prayer which they will recommend to the entire Association for adoption. Here it is, under the title of "A Business Man's Prayer":

Teach me that sixty minutes make one hour; sixteen ounces one pound, and one hundred cents one dollar.

Help me to live so that I can lie down at night with a clear conscience, without a gun under my pillow, and unhaunted by the faces of those to whom I have brought pain. Grant that I may earn my meal ticket on the square and that, in earning it, I may not stick the gaff in where it does not belong.

Deafen me to the jingle of tainted money and to the rustle of unholy skirts. Blind me to the faults of the other fellows, but reveal to me my own. Guide me so that each night when I look across the dinner table at my wife who has been a blessing to me, I shall have nothing to conceal. Keep me young enough to laugh with my children.

And when come the smell of flowers, the tread of soft steps, and the crunching of wheels out in front, make the ceremony short and the epitaph simply—

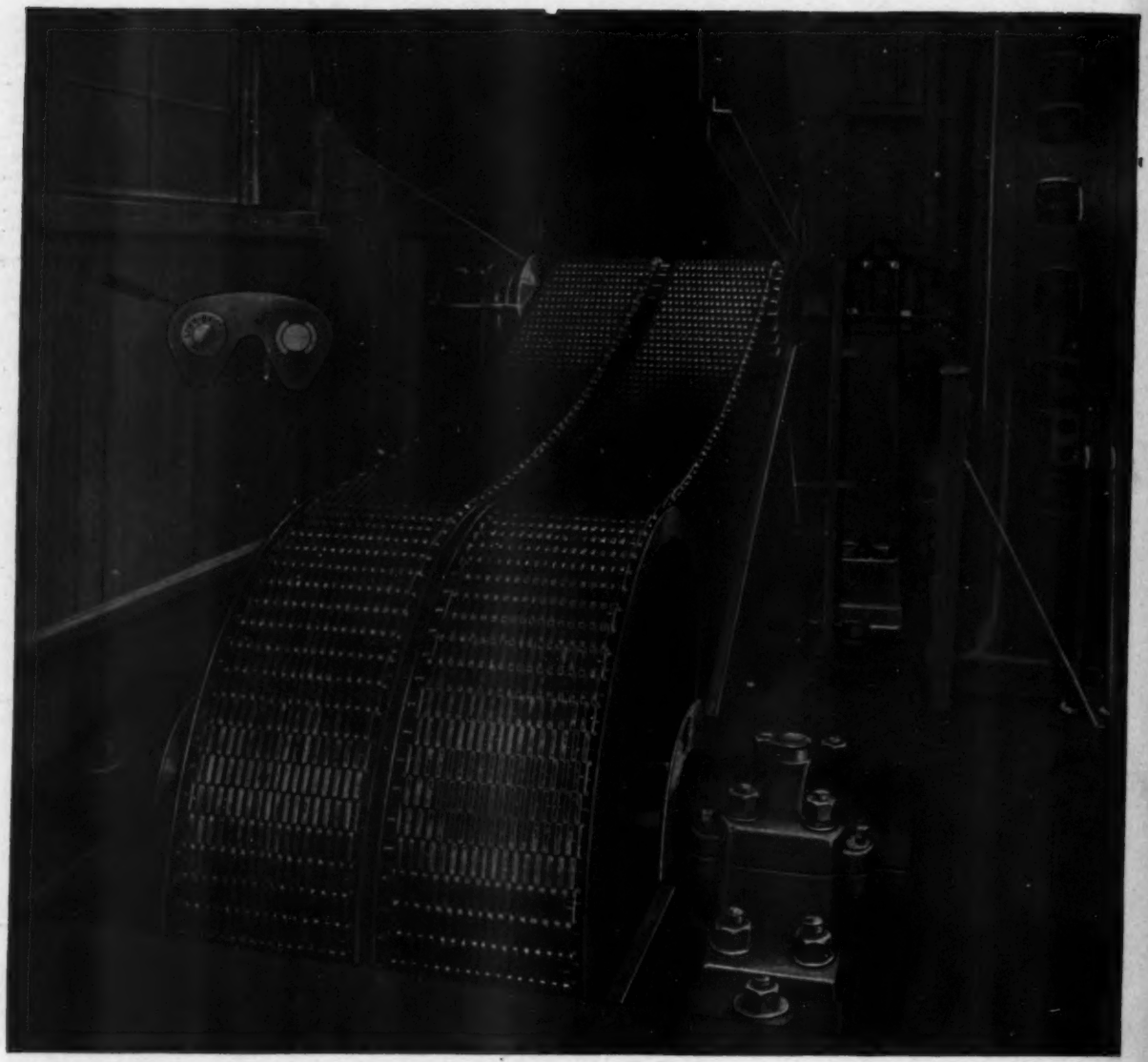
Here Lies a Man.

Several executives were the guests of the Association, and T. J. McManus, Director of Advertising and Publicity for the Edison Division of the General Electric Company, was the speaker of the day. He told how an advertising man looks at the salesman, and particularly how he looks at the man who tries to sell him.

"What I want most of all is sincerity from a salesman," he said. "I do not care much about these tricks of selling. I want information, and a knowledge of his product from a salesman, and if he lacks these essentials he cannot get me a second time.

"Advertising should be tied up closely with any selling campaign, and the sales and advertising departments should work hand in hand, lay their plans jointly, and carry them out in harmony."

At the annual meeting of The Sandy Hill Iron & Brass Works, Hudson Falls, New York, held May 1st, the following directors were elected: A. J. Kennedy, C. W. Kellogg, J. M. Ferris, R. C. Tefft, Jr., and H. L. Broughton. After the stockholders' meeting the directors met and elected the following officers: A. J. Kennedy, President; R. C. Tefft, Jr., Vice President, and J. M. Ferris, Secretary-Treasurer.



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An Executive's Viewpoint on Subject of Co-operation Between Superintendents and Cost Departments

By GEORGE A. GALLIVER

President, American Writing Paper Company

An Address Delivered Before the Joint Meeting of the Cost Association of the Paper Industry and the American Pulp and Paper Mill Superintendents Association, at Kalamazoo, June 1, 1922.

THAT the subject assigned me is pertinent and timely, is evidenced by the fact that your two associations are meeting here today jointly for the exchange of ideas and for the building up of closer co-operation. Each group probably has a somewhat different idea as to the object to be gained by this meeting. The cost men feel that it is to settle for all time any question in the minds of the superintendents as to the real value of cost systems and cost accountants in the mills. Very good. You superintendents are undoubtedly hoping that you can make the cost accountants come out of the clouds and either get down where you live and help you solve your problems, or else get out and not bother you. Again, very good. As representing the executive point of view, I hope both of you are successful, and shall attempt to make some contribution to the cause of each.

Obvious as it is, we must ever keep in mind that the object of the paper mills in this country from the standpoint of the administrators is to make and sell paper at a profit. The mills are not run to allow the superintendent to show his skill, wonderful and important as that skill is; nor to allow the cost accountant to show what a magnificent cost system he can build up, necessary as that is. They are run to manufacture a product of such kind and quality and uniformity and at such a cost that it can be sold in competition at a price that will bring a fair return to the owners for their investment, and for the risk they take in manufacturing. This fair return must contend with one factor among others, that each of you, from widely differing viewpoints peculiar to your vocations, must consider. I refer to waste, for example. We often find ourselves thinking of waste or of savings in their proportion to the entire cost of the manufactured article. This is misleading. For take notice, if a machine makes a thousand pounds of paper an hour, probably seventy-five pounds of that paper represents the profit to the mill. Now if it makes fifty pounds of broke, which is small compared to the thousand pounds, it takes out two-thirds of the profit. The margin between a loss and a profit, or between a product that can sell in a competitive market and one that cannot, is very small indeed, and you can see from this single consideration that everything therefore that leads toward exactness in control of manufacturing methods on the one hand, and accurate knowledge of costs on the other, is of the most vital importance. How necessary it is that you should work together.

The executive, human as he may be personally, on account of the responsibility he holds, usually for other people's property and investment, can never eliminate from his mind the question of costs and returns. You can talk to him about your good work, you may golf with him, and he may consider you a good fellow, but finally he has to judge by the one test, is he a paying proposition. For the main part, however, the growth of our different companies has brought you largely out of contact with the chief executive, and he is forced to judge by the cold figures that represent your work. I would say at once that the wise superintendent will make use of these figures before they go to the executive, for studying the efficiency of the various processes under his control and for improving his work. Therefore, superintendence and costs should go hand in hand.

At once will come the obvious objection that cost reports are often unreliable, that they are put up in such a way that the superintedent cannot understand them, and that they evidence gross ignorance of the papermaking process. These criticisms are often true, but they offer not an excuse for lack of co-operation between the cost man and the superintendent, but an evidence of the need of it. One of the prime functions of the cost accountant is to furnish material that shall be helpful to the superintendent and his superior officers. The cost man's business is to serve. It is his duty, therefore, to put his material in such form that the superintendent can understand it and use it. Both have the same end in view. Correct data and serviceable reports can be brought about only by the closest co-operation and the mutual confidence between the manufacturing staff and the accounting staff. The securing of such harmonious co-operation between the departments is one of the matters of chief concern to the executive. I may add here that the man who hopes to make a hit with his boss by repeatedly going to him with the tale "I did this," and "I did that," is making a grave mistake. One part of an organization must function and contribute to the strength of the other parts, and the "I did it" man shows at once that he has one of two weaknesses, either he is a conceited boaster, or he is a selfish individualist, and does not know how to get the teamwork that helps him along and is open to him from the other parts of the organization. Here is a prime source of error. In your own mill and in meetings like this you should seek to find great good in each other.

Efficient Cost Data Essential

A few of the outstanding reasons why efficient cost data is absolutely essential from the managerial standpoint may well be stated here. It should be understood that efficient data is the information that can be obtained only by the closest co-operation of the cost and manufacturing departments. An executive will look with doubting on cost information given him by a set of accountants who are out of harmony with the manufacturing department. *First*, the control of business necessitates accurate and detailed knowledge of costs in every department of that business. Even the farmers are rapidly learning this and have their customs of farm accounting, and I venture that a good proportion of you maintain your household accounts so that you may control your personal expenditures. Today bankers judge an industrial concern more on the basis of its management and the accuracy with which this management knows and controls its affairs than on its earnings of the past or its property accounts. The executive without accurate knowledge of his costs is like a man walking blindfolded on a narrow path with a precipice on each side. He cannot expect to have the confidence of his bankers, his stockholders, nor his business connections. *Second*, it is only through the reliable cost data that the manager can determine the weak spots in his departments and strengthen them as needed. If a mill has some old equipment that is operating inefficiently, there is no surer way of bringing about its repair or replacement than by showing cost figures which indicate a waste. Likewise there is no easier way for a superintendent to bring up the work of a foreman than by showing him the actual record of his performances. The correction of both men and machines are thereby facilitated. Effective cost figures are in fact statistical reports on the performances of the different departments, and any superintendent or foreman who is not willing to co-operate with the cost man at once lays himself open to the suspicion of being afraid to have his record known. Fortunately such reports work also the other way and bring the accomplishments of the efficient superintendent to the attention of his chief. *Third*, a knowledge of costs is essential for the determination of selling prices. This one thing alone would more than justify the expense of a good cost system. If, due to an inaccurate knowledge of costs, prices are set too high, there will be a lack of orders and the mills will go down. If on the other hand, they are unintelligently set too low, the mill will be operating at a loss, with its con-

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"Duro" Fig. 897

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sequent lack of funds for better equipment or improvement, or for better salaries, thus making impossible the betterments you superintendents are so anxious to have, and your executives would be glad to give you. In the final analysis, the prosperity of each employee must be dependent upon the prosperity of the company he serves. Not only does the ignorant pricing of goods injure the company practising it, but due to its effect on the general market, it works an injustice to every competitor and to every employee of such competitor, and to the industry on the whole. It is far-reaching, indeed, in its blighting effects.

Let me cite another instance. Some of our very best papermakers believe that they can make paper in their particular mill just as cheaply as any other papermaker can make paper in his mill. A great deal of price making is based upon this idea. If one mill makes a low price on paper, another mill will say that if that mill can afford to do it, he can likewise do it, and will book the business at the same price or a shade lower in order to have something to run upon. This sort of reasoning is foolish, and I believe it is rapidly becoming obsolete. I know it is so far as our mills are concerned. The fallacy lies in the fact that one mill with its equipment can handle any specific pulp at a certain cost and another mill can better this or not do as well, one or the other. We are able in our group of twenty-six mills, to check this up absolutely. Every mill we have varies from every other mill in its ability to utilize some material or other economically. I do not mean by this that some mills are no good at all and others splendid, but that some mills are the best for the utilization of some materials and other mills best for the utilization of other materials, and that each mill has its particular forte. If a management knows this it can make money with its mill by putting it upon certain papers in which this particular mill can beat competition, and cutting out absolutely other papers upon which the mill could not meet competition. Selection is therefore the watchword. The superintendent in a case of this kind is entirely dependent upon accurate cost work in order to have the data upon which to make the selection. Any superintendent before me who is in a company that has more than one machine and more than one set of equipment before and behind each respective machine, will, upon due consideration of this matter, agree with me, I am sure. In referring to mill in this connection, we might just as well refer to the machine, with its fore and aft equipment. Here is where the cost department, by co-operating with the superintendent, can accomplish a great deal toward making its company a success.

Advice to Cost Accountant

If I may be allowed as a representative of paper mill executives to venture some advice to the cost accountant I would say:

First, "Do not become absorbed with the idea that your 'system' is absolutely right, and therefore a fixture, but keep it always flexible, subject to change whenever such change will make it more serviceable. Let it be subject to evolution. Here lies a valid reason for your association activities."

Second, "Do not be too ready to criticize the manufacturing department. You probably do not know all there is to know about paper making. Live and learn."

Third, "Cultivate the greatest tact and diplomacy possible both in installing your system and in operating it. Remember it cannot be successful unless you have the full co-operation of the manufacturing men. You cannot get this by arbitrary rulings."

Fourth, "With the co-operation of the manufacturing men, establish standards for each operation. Having done so, notify the parties interested only when variations from those standards occur. This will do away with a mass of uninteresting and unnecessary reports. It will bring about 'standard practice,' the aim of cost accounting."

Fifth, "Work with and through the superintendents and foremen, not against them. Do not make a report to your superior officials about a manufacturing problem until you consult your superintendent. Your analysis may be all wrong, and he will gladly explain the manufacturing department's side, with which you are probably not familiar."

Sixth, "Carefully explain the workings of your cost system to the superintendent, together with the ends you hope to accomplish through it, and he in turn will give you the information you must comprehend concerning the manufacturing."

Advice to Superintendent

To the superintendent I would say, "When a cost system is installed in your mill, make all possible use of it. Do not let prejudice or reports you have heard from some other mill influence you when you have not developed your own experience. You can know more than the other fellow only when you have actually experienced—not otherwise."

Second, "Remember the cost system is there to serve you, and see that the reports are so made out that you can understand and use them. You have your own ideas as to economies. Have the cost man check them up. You may be wrong. For instance, you may think you know the relative costs of bleached pulp or of bleaching unbleached, or of costs of beating different grades, or of shrinkages. Do not depend on figuring you do in your head. Consult your cost man."

Third, "Back up the cost man. Insist that your men fill in all the forms promptly and accurately. Remember that the data given the cost man by your own men is the very foundation upon which the entire superstructure is reared, and inaccuracies in the cost accountant's work are just as likely to be reflections on you as on him."

In closing I would point out that the conditions of the past few years when we contended with continually rising prices, through no credit to ourselves, saved us from the consequences of the many inaccurate and inefficient methods we countenanced. Now the general price tendency in all lines has recently been downward, and in the paper business must immediately be turned upward. Therefore, you must for yourselves assume the full responsibility for any ignorance and inefficiency or lagging, if you do your duty by your own mills. The manager who knows his business so well and has his information so accurate that he can control his affairs along a very narrow path, will be able to bring success to his company and satisfaction to its rank and file. Superintendents and cost men, do your best in double harness for the good of all.

One last injunction for superintendents and cost men respectively I wish to leave you. If you can together turn out standard papers and definite costs you will enable your association to serve, through its Executive Committee, or some other committee in authority, the whole paper industry in a way that will make your industry as outstanding and as successful as any other. You know we are considered a very backward industry. I have seen it stated more than once that there are two industries in the United States that do not know their costs, and also which have no definite or concerted merchandising policy; to wit, the paper industry and textiles in general. I give you this on the authority as well of a big business man who is interested in both. We want confidence restored in the paper industry, not only from the standpoint of investment therein, but in order that what the constant increase in population and business activity of America does for other industries and has not yet been able to do for paper, it may now do. If Judge Landis can restore confidence in baseball and Mr. Hays in moving pictures, an authoritative committee of your paper associations should do likewise for you. This is a Hoover idea. The co-operation of superintendents with cost men and vice versa is fundamental to this. See to it that you meet the responsibilities thus laid upon you and come through with flying colors.

Reclaiming Waste Heat in a Machine Room*

BY J. O. ROSS

J. O. Ross Engineering Corporation

IN the last few years the cost of ventilating a machine room has become a subject that requires a great deal of individual study. The old rule of thumb ways of figuring a ventilating system for a machine room has no place at this time. In the years gone by, a ventilating system for a machine room consisted of anything from a few coils of steam pipes strung along the roof to the most extravagant system that might be designed. If the system kept the roof dry, it was a good system. If the roof did not stay dry, it was a poor system. Sometimes a system was principally admired because there wasn't a sign of drip anywhere and the room was nice and cool and comfortable. The cost of operating this system very seldom was considered.

It began to be recognized that simply pulling air out of a machine room without making any provision for the incoming air was not right, and systems of blowing air into the machine rooms became more and more common. The amount of air blown in depended a great deal on the judgment of the man who was designing it, tempered also by the amount of money he thought the purchaser was willing to spend for a system. A certain number of air changes was allowed and in general it

*Address before the annual convention of the American Pulp and Paper Mill Superintendents Association, at Kalamazoo, Mich., June 3, 1922.

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was considered that this must be fresh air and that it must be warmed enough to prevent condensation from the moisture rising from the machine. In general it was felt that if a machine did not have a hood, it would probably need more air supply, but the system was designed more for the room, than for any relation to the paper produced. This way of figuring explains why the country is dotted with good systems and poor systems. As the size of paper machines kept increasing, due either to the speeds going up, or the width of the machines being increased, these designers of systems kept getting deeper and deeper into trouble. The machine room for the new big machine wasn't much bigger than the room required for the smaller machine, therefore about the same ventilating system was all that was necessary. The fact that it might have to do twice the work of absorbing vapor was not very seriously considered.

Principals of Proper Ventilation

Today we are beyond that stage and the proper ventilation of a machine room is a science in itself and a specialty which requires not only a clear understanding of the theoretical principals but a very great deal depends on a wide experience under all classes of paper production. There are a few basic principals which must be borne in mind before any system can be designed.

First, a ventilating system must be designed to absorb the vapor arising from the paper machine without allowing it to condense in the building. This means that a clear understanding of the amount of vapor must be obtained and also the general construction and details of the building itself must be studied in order that the heat loss of the building may be offset.

Secondly, all the air which passes out of the monitor or ventilators of a machine room is heated somewhere in the mill. It doesn't matter where this air is heated, steam has been used to do the work and must be charged against the cost of ventilation. If a machine room has a system for drawing the air out and no provision for letting it in, the steam has been used somewhere either in adjoining parts of the mill such as the beater room or finishing room or from steam coils in the machine room or from the dryers themselves. You cannot get something for nothing and you cannot discharge to the atmosphere large quantities of hot air without having paid for heating it.

When some of the mills installed definite systems for blowing warm air into the machine room, they were astounded at the amount of steam that these systems used. Sometimes a mill felt when a proposal was submited to them that they could not afford to use the amount of steam that was specified and that they would go on just pulling air out of the room. They forgot, however, that they were using probably as much or more steam then and that they were like the ostrich, burying its head in the sand, in feeling that they were not using steam, simply because they couldn't see it concentrated at one point. If you had a continuous stream of coal flowing down from your plant into the river, you would be pretty sure you were paying for it even if the pile of coal in the boiler house didn't seem to be any smaller.

That is exactly the condition in ventilating a machine room. As a matter of fact, the chances are that the man who has no way of blowing the air into his machine room is using more steam than the man who has. This is due to the fact that the air entering the room by leakage probably short circuits to the ventilators without spreading over the room and keeping the whole roof dry. Sometimes this has the effect of keeping the machine room cool, but the fact is lost sight of that if the air is cool leaving the machine room, it has not got the capacity to carry out enough vapor and therefore a great excess quantity of air must be used with the consequent greater amount of steam required for heating this air. If this fact is clearly borne in mind—that you must heat all the air which is leaving your machine room, it will be much easier to figure what you need in the way of a ventilating system.

The Paper Machine Hood

The question of a hood is not a question for guessing at or vague theorizing about, but has certain definite advantages and disadvantages that can be clearly understood and a decision made as to whether or not a hood should be used. From a ventilation standpoint a hood is a great advantage. It does not allow the vapor to spread over the room but concentrates it and carries it to the monitor or ventilator at the highest possible temperature and at the greatest possible degree of saturation. This means that each cubic foot of air removed from the room will carry much more moisture and therefore a very much smaller quantity of air must be used with a great consequent saving in steam. From the paper makers' standpoint, there may be objections to hoods. It blocks the light and may be more or less in the way and in some cases was blamed for collecting dirt, which would fall off on the paper machine and as constructed in the past was often a fire menace and a general nuisance. There are new types of hoods on the market, however, which are fireproof, clean, actually prevent dirt from falling on the paper, are substantial and good-looking and perform very valuable work in reducing the cost of ventilation. There was a very interesting paper written by Howard S. Taylor a short time ago in regard to the use of a hood versus no hoods on paper machines. He demonstrated clearly this point of carrying the air out at a higher temperature and showed the enormous saving in steam.

The cost of ventilation of the machine room is a good deal more than many people realize. It is often a large percentage of the amount of steam required for drying the paper. In a recent test on a forty ton mill, they were using on a day which was 10° above zero outdoors 244 H. P. for ventilating the machine room. To dry the paper on the machine they required 230 H. P. They were therefore spending more money for ventilating than they were for drying which is absurd. They were carrying the air to the atmosphere only 32% saturated and were using altogether too much air. With a properly designed system using steam for heating the air, they should have been using only 90 H. P. for ventilating the roof which was about 40% of the steam required for drying.

On a recent test made on a book mill, which had no system of blowing air in but has a very definite method of drawing the air out, and was provided with steam coils on the ceiling of the machine room to keep the roof dry, we found by testing the amount of air passing out of the machine that they were sending to the atmosphere approximately 57,000 cubic feet of air per minute and were using 8,100 pounds of steam per hour, yet the roof dripped. A proper ventilating system designed and installed in the proper manner would have only supplied 48,000 cubic feet of air per minute and would have taken 6,500 pounds of steam per hour and kept everything dry. In other words, they were using more steam than they should have been using if they had had a first-class system which shows the progress that has been made in figuring the steam required to ventilate a room.

The Briner Economizer

There is no other way that this can be improved except by utilizing the waste heat which pases out of the room and this is now being done. Two-thirds of the steam that is used on the paper machine dryers for drying the paper is used up in turning the water into vapor. If this vapor can be turned back into water, this heat can be recovered and this is the basis of the so-called Briner economizer. This is an ingenious machine which extracts the heat from the air passing out of the machine room and puts this heat into the air going into the machine room. The waste air passing out cools down and begins to condense. In condensing it gives up the latent heat which is an enormous quantity. In rough figures for every pound of vapor that we can condense into water, we get the heat equivalent to a pound of steam.

Several of these economizers are now in use and several are being installed at the present time. On tests made on the machines in use, the air supplied to the machine room is heated from zero to about 90°. In many cases this is sufficient to provide all the ventilation for the machine room without the use of steam. Referring back to our forty ton mill which was taking 244 H. P. of steam but with a first-class system would have taken 90 H. P. of steam, we would only require 26 H. P. of steam with a Briner economizer.

There is another method of utilizing this waste heat and that is to draw the vapor through sprays of water. These sprays of water cool the vapor down and the heat released raises the temperature of the water very considerably. This is the latest development in the utilization of waste heat in the paper mill. It is a waste which has gone on from the beginning of the industry and a waste which has probably troubled the conscience of the paper maker more than any other waste. He has realized the enormous heat being carried out of the mill in the form of hot vapor and yet it has always seemed a source of waste that could not be prevented. With these methods, however, this waste can be turned into useful work and the time is coming when a mill which allows the vapor to escape to the atmosphere while they use steam for heating air in the mill, will be considered just as bad as the mill which now throws steam to the atmosphere continuously while they use live steam for heating water.

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Handling Wood Room Equipment*

BY FRANK J. CARROLL

IN the preparation of a paper covering the above subject, one naturally leans to that part of the wood room equipment which is most familiar to him, hence I will confine my remarks to the care of Saws and Machine Knives.

If I can indulge on your good nature for a few moments to tell you a little about how saws and knives are manufactured, I know that I will be able to make my talk more interesting and instructive.

It may surprise you to know that in the manufacture of a chipper knife for instance, there are fourteen distinct and separate operations before it is finished, and about the same number in the manufacture of a saw. Each operation is under the supervision of an expert in order that each saw and knife be uniform in quality.

I was reading a Government Report recently on "Reforestation" and was somewhat surprised to learn that there is cut each year in the United States, about five and one half million cords of wood, to be ground or cut up into pulp to make paper. Also that one New York paper alone uses about two thousand acres of forest a year.

In the manufacture of this vast amount of wood into paper, saws and machine knives play an important part indeed, and it is no wonder then that the saw and machine knife manufacturer has to produce an article that will do this amount of cutting and do it well.

It is most essential that the saw and knife be made from the right kind of steel in order to get the best results; also that they be heat-treated properly so that they will retain their cutting edge and do good work.

In the manufacture of steel for saws and knives, it is absolutely necessary to have the right kind of steel, or what we term, the correct mix, in order to obtain the best results and every manufacturer of saws or knives is always on the alert to improve his steel, if possible.

As with the manufacture of paper, so with the manufacture of steel. It is necessary that you have the correct proportion of sulphite, ground wood and sizing in order to get a satisfactory sheet. In steel, we have to have the correct amount of iron, carbon, scrap and whatever alloy is used to get a steel that will serve as an edge cutting tool.

In order to make a uniform article of steel, it is most essential that a manufacturer know what his steel is made from, and the most successful ones are those that are able to manufacture their own steel for their saws and knives.

In the handling and care of wood room equipment, such as I have been referring to, it is important that they be given the same attention as other operations which may seem more important, in order to get the best results, and this leads me to the point where I wish to say a few words as to the proper care of saws and knives.

The Manufacture of Knives

Knives to be properly hardened should be thoroughly annealed and brought to a state of complete relaxation. This causes a more uniform hardening and lessens the liability of so-called Hard and Soft Spots. To obtain the best results in the heat-treatment of steel, the exact ingredients of the steel must be known and the metal heat treated accordingly.

Perfect hardening, however, will avail nothing, if a suitable temper is not given for the kind of work the tool is expected to do. Whenever possible the kind of wood to be cut and the conditions under which it is done should be known. The knife manufacturer is then in a position to furnish the temper best adapted for this particular condition.

Oil tempering is generally recognized as being superior to any other method heretofore used, for by its circulation it permits a uniform heat throughout the bath and has penetrating qualities superior to any other method. The degree of hardness is determined by the temperature of the oil while the time of immersion is governed by the mass of metal and thickness of the material.

Proper Grinding

After all these desirable qualities are imparted to the steel, they may be rendered useless in an instant by improper grinding.

There are probably more tools ruined in grinding than from any other cause, and governing this are several reasons, which, if kept in mind, will eliminate a great deal of expense and annoyance. Among these are the kind of metal being ground, speed of the wheel, grade and grain of the wheel, pressure applied to work, and probably the most important of all, the cooling medium and how it is applied.

Water is usually used for this purpose with good results. To be more effective it should be applied as close to the point of contact as possible as this is where the heat is generated. Too much water cannot be used and an insufficient amount is a bad or in fact worse than none at all. The reason for this will be readily understood when it is borne in mind that the heat is generated at the point of contact and when the volume of water is not great enough to absorb and carry away this heat, a segregated area of highly heated steel is set up, surrounded by a hard unyielding metal.

The localized expansion set up by this small heated area results in producing undue strains in the metal which will distort the knife, cause soft spots by drawing the temper and if carried a little farther, will result in cracks, caused by small particles of water striking the over-heated mental, and also causing small cracks by the rapid local contraction of the steel.

Wheels which are too hard or run at too high a speed will also bring about this condition. Some care should be given the condition of the wheel and machine.

A grinder with badly worn bearings or other working parts will cause excessive vibrations which will at times cause unequal pressure at the point of contact.

Care should also be used to see that the wheel does not become clogged or loaded. Both of these conditions will cause overheating. In a glazed wheel the small abrasive particles or cutting points break off instead of dislodging and allowing new points to come into play. This denotes too soft a wheel, while in a loaded wheel the cutting points do not break or dislodge, but the areas between become clogged or loaded with the material being ground and ceases to cut effectually. This denotes too hard a wheel.

When a grinding wheel becomes small in diameter, it leaves an excessively concave bevel which impairs the strength of the cutting edge. As a small wheel rapidly decreases in efficiency, it is usually economy to replace it with a new one. It is sometimes thought that a grinding wheel is a grinding wheel, and should cut under any conditions. This is a mistaken idea. The hardness and grain or fineness of a wheel should be determined by the material to be cut. As a rule, the harder the metal the softer the wheel should be and vice versa. Within certain ranges this can be remedied by increasing or decreasing the speed as the case may be, but where the range varies very much, it is economy to procure the proper wheel.

The length of the bevel on a knife is another important matter. The manufacturer of knives, through years of experience, can determine the length of the bevel best adapted for a particular knife and it is well to retain, if possible, this same degree of bevel in regrinding. If the bevel becomes too long, it weakens the cutting edge and if too short you will run into cutting trouble and also the knife might not clear itself. It is good policy, however, to shorten the cutting bevel during the winter months in the North, for the barker and chipper knives are under a terrific strain when cutting frozen woods.

As to solid and plated steel knives, this is a matter of personal opinion as to the best results obtained from each, and a knife manufacturer is always willing to furnish one or the other, but my personal opinion is that a solid steel chipper knife is the best knife.

The Care of Saws

If it is important to run knives with care and attention, it is also important that saws be given the same attention and care.

The teeth should all be of the same length, so that each tooth does an equal share of the cutting. They should have the correct pitch for their particular purpose.

One of the main reasons for cutoff saws cracking is because the teeth are too long. The main purpose of the gullets is to contain and carry out the sawdust and therefore they should not be larger in area than the amount of timber severed by each tooth as determined by multiplying the amount cut by each tooth by the depth of the cut.

To illustrate, if each tooth cuts 1/16 of an inch and the log is 16 inches in diameter, you will have one square inch of sawdust that each gullet must carry off. As a rule we find the gullets two or three times larger than necessary.

Inasmuch as cracking is usually the result of vibration, you will readily understand that the longer teeth are more subject to vibration than the shorter or stiffer teeth. Also in this connection it is well to bear in mind that a narrow gullet concentrates whatever vibration there may be in the teeth and therefore causes cracking, whereas with a shorter tooth and wider gullet these vibrations are distributed over a greater area of the saw blade without doing any damage.

Another cause of saws cracking is that some saws are run for too long a time without having the tension restored by hammering.

*Address before the annual convention of the American Pulp and Paper Mill Superintendents Association, at Kalamazoo, Mich., June 1, 1922.

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Due to wearing away of the rim, or tire of a saw, it gets into a condition whcih saw makers term fast under the gullets, which causes repeated undulation or vibration of the rim. It is therefore imperative that the saws be left opened or tensioned properly for the speed they are to run. In the winter sawing, it is better to reduce your set and shorten the bevel to get the best results.

The pitch or hook of the teeth should be determined by the position the saw occupies in relation to the material being cut. If the work passes above the center of the saw it can have more pitch than if the work passed beneath the center where too much pitch would have a tendency to pull the work onto the saw which might cause accidents or breakage of the saw.

This concludes my talk and I hope that I have been able to impart some new ideas to you so that you will be able to get better results in the care of that part of the wood room equipment which I have mentioned.

The Electrical Way*

Sectional Paper Machine Drive

BY S. A. STAEGE
Westinghouse Electric and Manufacturing Co.

WE are all fairly familiar with the mechanical way of doing things, as that is the way most of our work has been accomplished since the physical way was abandoned in favor of the easier and more satisfactory mechanical method.

In the paper mill we saw for many years the conveyors, chippers, screws, beaters, jordans, super calanders, etc., belted and driven from the long line shaft in the mill, as was also the case with the paper machine; until quite recently, that is to say, within the last ten to twenty years. Since this time the electrical way has rapidly come to supersede the mechanical system.

Not only is the electrical way rapidly superseding the mechanical way, but in manifold instances is stepping in and superseding the physical way of doing work without the usual intermediate stage of development, the mechanical way. Especially is this true in the use of household appliances.

The electrical way of carrying on the industry and commerce of the world is an accepted fact, and the only open question in regard to its further use is our knowledge of how best to apply it, and the economical questions entering into consideration. It also seems that the more completely we are able to adopt the electrical way in our industrial work, the more efficient we become and the higher the plane of science, industry and civilization and the electrical developments of the past few years have further elevated our social plane by reason of the reduction in drudgery of mechanical and physical labor.

What the Electrical Way Has Done for Paper Machine Drive

The purpose of this paper is primarily to point out what the electrical way has accomplished for us in paper machine drive, and how its benefits have increased with our knowledge of how to use it.

There has been a great struggle in getting away from the mechanical idea and conception of doing things. It is easier to continue as we are than to change to something new and untried, even though much better. Following the partial abandonment of the steam engine for paper machine drive, the constant speed motor was used in its place, utilizing the entire mechanical system formerly necessary including the ponderous speed changing devices of the cone pulley type, or the less flexible step pulleys, and of course including the long line shaft, section cone pulleys, open type bevel and spur gears and friction clutches.

One of the next steps of improvement was the abandonment of the mechanical speed changing devices which had previously been depended upon for varying the speed of the paper machine and replacing it with the adjustable speed type of direct current motor, thereby eliminating one of the large sources of power loss, and greatly increasing the flexibility and dependability of the paper machine control and operation, providing at the same time a notable example of the advantages attendant upon the more complete adoption of the electrical way.

Next in the course of events there came several efforts to further simplify the paper machine drive by eliminating the long variable speed line shaft, the section cone pulleys, the belts, the mortice bevel and spur gears, as well as the friction clutches, and to replace all of these possible sources of trouble heretofore supposedly necessary equipment by individual motors for each section of the machine. This revolutionary step was conceived by men who had passed through much experience of development in the art and who appreciated the economic meaning of the possibilities as presented by individual motor drive. Unfortunately for immediate further development along this line, there seemingly was a failure to fully understand all of the exacting requirements in paper machine operation and the limitations of the electrical apparatus then available and the tendency was to slow up and discourage further effort in this direction.

Not all of those early efforts were failures, however, as some are still in successful operation. Progress was slow, for so much time and expense was involved in the initial development required to obtain satisfactory performance, that neither the electrial manufacturer nor the paper mill owner cared again to hazard such an undertaking on account of the uncertainties involved, and it was not until such time as the problems to be confronted could be approached with greater assurance of complete success that interest was renewed.

In each of the installations of this period of sectional paper machine drive, entire dependence for speed regulation was placed in the inherent characteristics of the motors themselves, and up to this time no automatic regulating or control equipment had yet been devised of such a character as to meet the special problems here encountered.

Years passed and the electrification of paper mills became more complete, demonstrating, and securing the almost universal acknowledgment of the superiority of the electrical way. Hardly a machine remained to which the electrical motor was not directly applied without fear or hesitation, with the exception of the paper machine. Fortunately, however, in sectional paper machine drive the obstacles have now been overcome, and the electrical way has been placed upon a firm foundation, and today there are in use several types of the electrical way or system of sectional paper machine drive and control which are successfully performing the function for which they were intended.

It is readily conceded by all, I believe, that for high speed paper machine operation, electrical sectional drive is the best, if not the only practicable way. For very slow speed machines, some have felt and still feel that the old style of mechanical system is entirely adequate, and that the possibly somewhat higher initial cost of the electrial sectional drive is not warranted. There is also the intermediate zone of speeds in which sentiment also appears to be divided as to just when and where any additional initial expense attendant upon the installation of electrical sectional drive over and above that for the mechanical system, may be warranted.

The question of economy of course enters into any consideration of the subject. However, there is the possibility of exercising a short sighted vision of the elements entering into the real question of overall, real and lasting economy.

Of course, the nearer the cost of the paper machine equipped with electrical sectional drive approaches to the cost of the same machine equipped with the mechanical system of drive, the stronger does the argument for electrical sectional drive become. However, the importance of the question of relative first cost may be small as compared with other factors which should enter into the determination of the relative merits.

I believe it can now be demonstrated that in all classes and kinds of paper machine drive, the electrical way is the best way, and that it is now simply a case of determining what is the best electrical way consistent with the various economical considerations.

What Constitutes the Best Electrical Drive

Then arises the question—What is the best electrical way? It is not the most simple, the most reliable most flexible, efficient and economical, and the way best adapted to meet the local conditions where it is to be installed.

In the development of electrical sectional drive, effort has been made to get away from and eliminate as much of the mechanical system as possible. All have gone in the same general direction, but some have branched one way and some another, and some have perhaps been able to get farther away from the old mechanical system or way of doing it, but all has been progress. While we are unable to eliminate entirely the mechanical, the more electrical and the less mechanical the trend of our development is, the less susceptible is it to those influences tending to reduce efficiency and impede progress.

In making the transition from mechanical drive to electrical sectional drive, it was necessary that the apparatus from the start have a high degree of refinement and natural regulating ability in order to work at all and permit of normal or satisfactory paper production.

Following those early efforts at sectional drive, though some

*Address before the annual convention of the American Pulp and Paper Mill Superintendents Association, at Kalamazoo, Mich., June 3, 1922.

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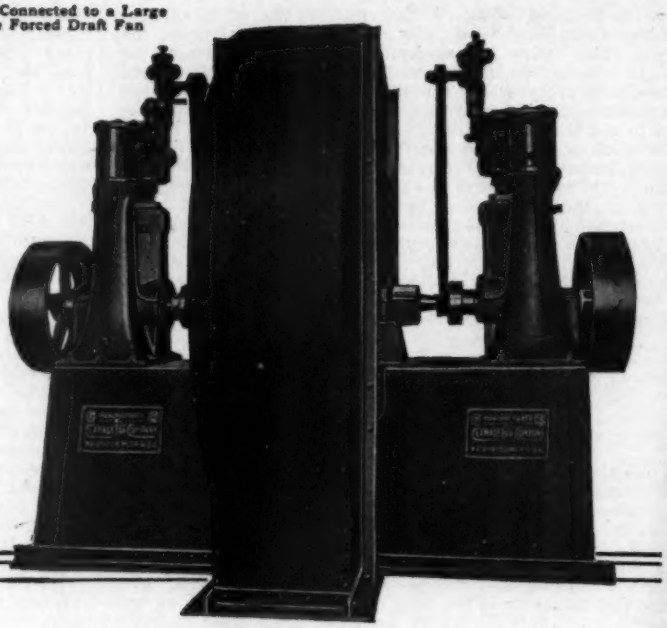

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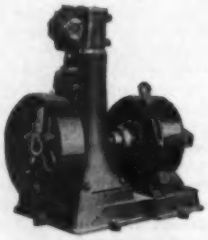

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years later, the development of speed regulating means, whereby the speeds of the several section motors could be accurately determined and controlled, has made possible a wholly satisfactory and reliable system of sectional paper machine drive.

Seldom does a new system appear, especially one so comprehensive as the paper machine drive and control, wherein some further degree of refinement cannot be obtained, based upon the experience and observation of several years of practical operation in the field. Such has been the case with electrical sectional paper machine drives, and the latest practice, which I am to describe to you is the result of such experience and effort in the line of simplification, refinement, adaptability and service.

In the Westinghouse system of electrical sectional drive, a direct current adjustable speed motor is coupled to each section intake shaft, either directly or through the medium of a reduction gear unit. These motors receive their current from an adjustable voltage direct current generator, which may be driven by a synchronous motor, constituting synchronous motor generator set, or it may be driven by a steam turbine or other motive power.

The direct current generator and all of the section driving motors receive separate field excitation from an excited unit which may be coupled to the direct current generator, or may be a separately driven exciter set. Control of the speed of the paper machine is obtained by adjusting the voltage of the generator which correspondingly changes the speed of the entire machine, or in some cases where especially wide range of speed is required, a certain part of the speed range may be obtained by simultaneous adjustment of the shunt field circuits of all of the section motors by means of a master rheostat or control.

The automatic speed control of the individual section motor, whereby the speed of each section is maintained at its correct relative value, is obtained by the use of simple slow speed little devices known as the rotary contactors.

There is a master rotary contactor driven by a small direct current motor, located at any convenient point, and one section rotary driven by each of the main section driving motors. These section rotary contactors are not coupled directly to the main motor, but are coupled to a small speed changer, which in turn is driven from the main motor or reduction gear unit through a small chain drive. This speed changer and section rotary contactor forms a part of the control system; and all of the section rotary contactors and speed changers together and including the master rotary contactor, require but a small fraction of a horsepower to operate, the only power being consumed is the friction of the brushes on the rotors and the ball bearing friction, which is negligible.

These section rotary contactors, speed changers, and master rotary contactor, together with a few resistance tubes, constitute the entire speed control system.

The rotary contactors consist of a small motor frame without winding and containing only a rotating drum resembling somewhat a commutator, having several fixed brushes which make contact therewith. The master rotary contactor has similar construction and the two are electrically connected together, that is, the master rotary contactor and the section rotary contactor; and operating together perform a function which takes the place of a rheostat in the shunt field circuit of the motor to which they are connected.

There is no moving part of the speed control system located on the control board. The only moving parts of the control system are the slowly rotating drums or rotors of the rotary contactors, the brushes being entirely stationary as in the case of an ordinary motor.

Through the means of the speed changers, or cone pulleys, to which the section rotary contactors are coupled, the "draw" or relative speed of the section can be adjusted as desired.

The usual starting equipment is provided for each section motor, which is usually mounted on a section panel with knife switch, overload, relay and ammeter; the starting equipment itself consisting of motor operated cam accelerating switches, which automatically cut out the resistance in series with the motor armature circuit as the motor is being started up, the whole operation being effected by push button control.

A generator panel is also required of the usual type carrying switches, circuit breaker, voltmeter, ammeter, etc., as well as rheostat for the exciter. The exact arrangement of panel and instruments depending upon the particular installation.

The functioning of this speed control system is similar to the performance of synchronous motors, inasmuch as the direct current motors can be definitely locked together, thereby permitting of no variation in relative speeds. They are different, however, from synchronous motors, in that the direct current motors can be locked together in any desired speed relation, which they will thereafter maintain, whereas synchronous motors can only be run together in one particular speed relation.

There are no synchronous motors used in this system of paper machine drive or control, nor are there any other kind of motors used besides the main section driving motors, with the exception of the small direct current motor driving the master rotary contactor. The section rotary contactor and the master rotary contactor effectively lock the motors together in such a manner that relative speeds cannot be changed except by changing the adjustment of the speed changer, that is, by shifting the belt on the cone pulley; as the rotor of the section rotary contactor operates at all times at absolutely the same speed as the rotor of the master rotary contactor.

There is another likeness between the synchronous motor and these direct current motors thus locked together, and yet an unlikeness. In the case of any synchronous motor, when a load is thrown on, the revolving rotor of the motor falls back somewhat in angular position or phase relation with the generator which is driving it, or with any other synchronous motor opearting from the same frequency source, although it does not lose any revolutions per minute, and continues to rotate at the same speed as soon as this displacement has taken place, and again, when the load has been reduced on the motor, its rotor moves forward a certain degree, thereby again changing its phase relation possibly back to the original value. In a similar manner, when a load is thrown on the direct current motors locked to the master by the rotary contactors, the motor does not change in revolutions per minute, but simply falls back a few degrees in angular displacement or phase relation with the master and with the other section motors being controlled by the same master rotary contactor. Similarly, when the load is thrown off again, the armature or rotor of the direct current motor will move forward a slight amount, thereby retaining perhaps its former phase position, but in no case will it actually change in revolutions per minute, but will only tend to change the same as does the synchronous motor; and the way in which the functioning of the direct current motors, as referred to, is different from the synchronous motor is that the direct current motor can be so constructed that it may not necessarily have to fall back in angular position or phase relation when a load is thrown on, not even as much as would be necessary in the case of the synchronous motor, inasmuch as the direct current motor can be built with what is known as a flat load speed characteristic.

Examining more closely into the exact method by which these very simple little rotary contactors are able to do such extraordinary work in controlling the speed of the direct current motors with absolute precision, we find that an operation takes place insofar as electrical effect is concerned, closely related to the performance of the well known voltage regulators, the primary difference, however, being that there are no moving or vibrating contacts or parts such as are used in the conventional types of voltage regulators.

As has previously been stated, the section rotary contactor operates at exactly the same speed as the master rotary contactor. If there is any tendency for the section motor to slow down in speed, thereby causing a slight falling back or angular displacement of the sectional rotary contactor with respect to the master rotary contactor, additional resistance is in this way introduced into the shunt field circuit of the section driving motor, or more correctly speaking, given values of resistance are inserted into the motor field circuit a greater percentage of the time. As a matter of fact, both of these things happen; that is, when the section rotary contactor falls back a few degrees in angular displacement with the master rotary contactor, a given value or values of resistance are cut into the motor shunt field circuit periodically at a relatively high rate of speed, a greater percentage of the total time, and a larger actual value of resistance also may at the same time be automatically introduced. In this way any change in the angular or phase relation of the section rotary contactor with the master causes a change in the voltage impressed across the shunt field circuit of the motor and a corresponding charge in field current, thereby synchronously holding the motors together.

All of this regulating operation goes on absolutely without sound and with nothing to be seen.

It is, of course, obvious that with such sensitive and positive control and effectually synchronous operation of the direct current motors that the draw of each section can be controlled and maintained with a nicety, and it is, of course, unnecessary to make any adjustment at the speed changers unless it is desired to change the relative speeds of the sections.

DETERMINE the initial cost, erection cost, maintenance cost, and the safety and reliability of a power plant when the system is designed.

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Push Button Control

In the full push button control, that is where the starting equipment is mounted on the section control panels at some remote distance perhaps from the paper machine itself, push buttons are provided for each section and a master push button station for the entire machine. Each section push button station has an inch, a start, and stop button, and in addition has a lock or safe button which when locked makes it impossible for anyone to start up the section until it is again unlocked with the key. This prevents any injury to employees or damage to the machine by the possible starting by unauthorized persons, or at times when someone might be working on the machine without the knowledge of the operator. The master push button station has a fast and slow button, by means of which the speed of the entire machine can be raised or lowered at will.

The cam starting switches, in the case of the full push button control are motor driven and are started and stopped by the section push button stations, whereas in the hand starting equipment, the starters are hand operated, the cam starting switches being much the same as in the former case but operated by hand lever instead of by a small motor. In the case of the hand starters, stop push buttons are provided, however, for each section.

With this type of electrical sectional drive and control the operation is very simple. Assuming that the generator is running, the operator simply pushes the start button and the section driving motor starts, comes up to speed and pulls into phase with the master automatically, and is then held at the desired speed. Every other section can be started up in the same way and can be stopped when desired without interfering with the other sections.

The generator panel and section starting panels, for they are only starting panels, can be located in a room by themselves or at a convenient point on the back side of the paper machine, or at any point desired within a reasonable distance from the paper machine motors. In the case of hand starters, these may be located on the back of the machine or the front side as desired, where found most convenient.

In the case of either direct connected motors or motors with reduction gear units, flexible couplings are provided between the driving motor or gear units and the paper machine intake shaft. This is done in order that any misalignment which may develop on account of a bearing on the paper machine wearing down may not cause any serious accident which might result were a rigid coupling used.

A flexible coupling is also provided in the case of the reduction gear unit, between the motor and high speed shaft of the gear unit.

In all cases where the reduction gear unit is used, both gear unit and motor mounted on a common bedplate which also carries the small speed changer and section rotary contactor in an inconspicuous position between the motor and gear unit, the speed changer being driven by a small chain drive from a sprocket on the slow speed shaft of the gear unit. In the case of the direct connected motor, the speed changer is driven from a sprocket mounted directly upon the motor shaft.

The type of reduction gear unit usually employed provides a high angle drive which can be made either right hand or left hand to best accommodate the space available, and equipment of this kind for complete electrical sectional paper machine drive can be installed in any plant where a mechanical system of drive has been employed and in the same or less space than was required on the machine room floor for the mechanical system. This and the further fact that with this type of drive no depression in the machine room floor is required to accommodate the gear unit or motor, makes possible the changeover of any and all existing mechanical drives to electrical sectional drive. It is even possible and practicable to change over one section of paper machine drive at a time in order to prevent interruption of production during the changeover period, part of the machine being driven as before from the line shaft while other sections may be driven from the new section motors, but all will be so synchronized together as not to interfere with the usual operation.

Successful Installations

Evidence of the durability and reliability of electrical sectional drive is to be seen in the performance obtained from drives of the earlier type installed some ten or twelve years ago. The installation which was made of a Westinghouse sectional paper machine drive at the Defiance Paper Company, Niagara Falls, N. Y., on a 90 inch Pusey & Jones Fourdrinier machine, has been in practically continuous operation for twelve years, and is in excellent condition today, no repairs of any consequence having been made to the motors, generator, gears or control equipment. As a matter of fact, there has never been an armature or field coil repaired or replaced. The reduction gears used are open spur gears with rawhide pinions. The life of the rawhide pinion has been about three years, which means that there have been about three replaceals of the pinions, but the gears have shown no appreciable wear.

The more recent installations of sectional paper machine drive, employing reduction gear units, are similar in general characteristics, except that the gear units now used are of totally enclosed type and of more refined form, the starting equipment has been greatly improved, and most important of all, automatic speed control means have been provided. Systems of this type are now in operation at the Abitibi Power & Paper Company, Iroquois Falls, Ontario, on a 158 inch Pusey & Jones Fourdrinier paper machine having a speed range of from 400 to 1,000 ft. per minute; at the Arrowhead Mills, Fulton, N. Y., on a 144 inch Rice Barton & Fales cylinder board machine, having a speed range from 50 to 200 ft. per minute; and at the West Virginia Pulp & Paper Company plant at Tyrone, Pa., on a 168 inch Pusey & Jones Fourdrinier book machine, and also on a 98 inch Fourdrinier book machine, both of which machines have a speed range of from 250 to 50 ft. per minute.

The electrical installation of sectional drive on the 98 inch Fourdrinier book machine at the Tyrone plant of the West Virginia Pulp & Paper Company, is of the latest improved and simplified form of speed control, using the master and section rotary contactors which I have already described.

Westinghouse sectional paper machine drive is to be installed at the Washington Pulp & Paper Company, Port Angeles, Washington, on their new 164 inch Bagley & Sewell Fourdrinier news print machine, to have a speed range from 400 to 1,200 ft. per minute; for the Brown Company, Berlin, New Hampshire, on their new 136 inch Bagley & Sewell Fourdrinier machine, to have a speed range of 400 to 1,200 ft. per minute; and at the Riverside Fiber & Paper Co., Appleton, Wisconsin, on their new 120 inch Beloit Iron Works machine, which will have a speed range ratio of 7 to 1.

I have tried to point out to you that the sectional paper machine drive is applicable to all types and speeds of paper machines from the highest speed to the lowest speed, and for any and all ranges of speed, and not only that it is applicable but that it has been tried and demonstrated to be satisfactory and efficient.

I have also endeavored to show how that even in old mills where but little space is available, sectional drive can be installed, and the many advantages to be obtained from its use.

In the case of new mills or new machine rooms where sectional drive is to be installed on high speed paper machines, it is possible to use either direct connected motors or drives with reduction gear units inasmuch as provision can be made in the building construction to accommodate direct connected motors if desired, and the choice between direct connected motor and motor with reduction gear unit should be made on the basis of efficiency, performance, economy, and general suitability to the particular case, it being possible to obtain entirely satisfactory performance in the case of most medium and high speed machines with either direct connected drives or motors with reduction gear units.

The sectional paper machine drive with its simplicity, flexibility, and adaptability is now within the reach of every paper mill and suitable for every paper machine drive. Therefore, for the common good of the industry and for your own prosperity in particular, let the Electrical Way be the foreword, and let your installation be the Best Electrical Way.

Co-operation Between Superintendents and Cost Accountants*

BY JOSEPH SLATER

Superintendent, Escanaba Pulp and Paper Co.

IN considering the manufacture of any product, it goes almost without saying that the fundamental object is profit. Consequently, we find that men exert themselves in every way to improve the quality and make more desirable the article they may be manufacturing. But very often more profit may be gained by higher efficiency and a proper arrangement to measure where losses occur. Especially in pulp and paper making has much thought and energy always been given to producing with greater speed a given amount of product without increase of plant equipment so that profit might be maintained in the face of competition.

*Address before joint meeting of the Cost Association of the Paper Industry and the American Pulp and Paper Mill Superintendents Association, at Kalamazoo, Mich., June 2, 1922.

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98-in. Pusey & Jones Fourdrinier Book Machines, 250 to 500 feet per minute.

98-in. machine started July 25 and the 166-in. Oct. 22, 1921.

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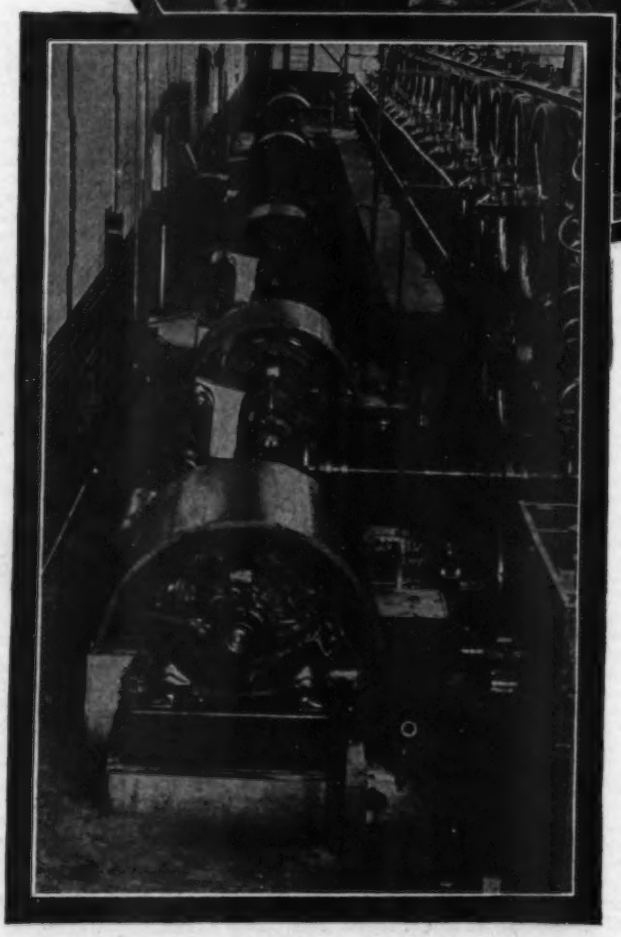

West Virginia Pulp and Paper Company

THE Westinghouse Sectional Paper Machine Drives in the Tyrone (Pa.) mill of the West Virginia Pulp and Paper Company have been in service about ten months.

The performance of this, and similar installations, recommends Westinghouse Sectional Paper Machine Drive to the consideration of all paper manufacturers.

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East Pittsburgh, Pa.
Sales Offices in All Principal American Cities

In making this effort in modern paper manufacturing with its many ramifications and the complexity which is so much a part of the business and which has been still further increased by the introduction of large units of manufacture, faster machinery and a more involved process, there naturally arises a vast mass of detail which must be carefully dealt with, otherwise there is abundant possibility for great loss.

For the careful and successful manufacturer, this makes imperatively necessary a close, comprehensive and thoroughly accurate system of cost accounting. So necessary is this matter that we believe a dependable system of manufacturing cost accounting is without doubt one of the most important features, if not the most important feature, in a paper and pulp mill at the present time, for the very nature of the business invites loss on every hand in a way that few other businesses can equal.

How extremely important, then, that the best possible system of accurate manufacturing cost accounting be adopted and followed by each mill and that there be the closest co-operation between the mill superintendent and the accounting department to make cost accounting a success and a true indicator as to whether the mill is making a profit or not.

It is, of course, self-evident in all manufacturing that some basis be arrived at through a manufacturing cost accounting system to enable the manufacturer to know the exact value of his product when ready for the market and to be in a position to sell it without loss. But it is not less important that additional consideration should be given to the whole process of manufacture to prevent losses that may occur and which may be prevented or improved—the object being to keep the price of the product low enough to meet competition with a similar product when manufactured by a thoroughly efficient mill guided by a dependable manufacturing cost system.

We fear that in the past there have been some mill superintendents who have rather resented the close follow-up of a cost system, or who have not fully realized its value in helping them to profitable operation. Perhaps the feeling at times has been that a cost system was an unfavorable criticism on their management or because the system was so manifestly inaccurate, from their standpoint, that it could not command their respect. However, this is a short-sighted view to take of the matter, although it may have arisen from many good reasons. For these reasons, it is desirable that absolute frankness should prevail between the superintendent and cost accountant. Doubtless, the cost accountant should have a good deal of tact and diplomacy in his make-up, but, on the other hand, the superintendent should understand that he must also cultivate considerable of the diplomatic attitude and come to a keen realization of the fact that his value to his plant and to his company consist in his ability to manufacture profitably in the face of whatever conditions may confront him. Therefore, the superintendent's interest in co-operating with the cost accountant should lead him to give his heartiest support and ablest assistance supported by suggestion and a real, live, vital interest in the object that the accountant is seeking to secure. The superintendent cannot expect that it is possible for him to know with any degree of certainty what is being done in the mill without manufacturing cost sheets—as well expect the navigator to sail the ocean safely without taking frequent observations of latitude and longitude, as to expect to manage a pulp and paper mill without a close and accurate record and check on manufacturing costs.

We believe there are today few, if, indeed, there are any, superintendents who do not realize this. However, we also believe that more interest can be developed and more interest can be shown in this subject. Nothing is more discouraging to an accountant than to find he is not getting the hearty co-operation of the superintendent, or that his figures, after having been carefully made up, are indifferently received. Personally, we feel that a superintendent supported by a careful, competent accountant, following a dependable cost system, together with the further assistance of a first-class master-mechanic, can undertake and carry to success the most difficult pulp and paper manufacturing operation.

Superintendent Should Keep Reliable Records

It is a matter of training. If the superintendent will apply himself to a careful study of the mill cost sheets, and arrange to have such sheets at frequent intervals, he will find the figures of wonderful assistance. Then, in order to have accurate figures, it behooves him to get busy and to arrange so that all raw materials, as pulp, fuel, wood, chemicals and mill supplies of every description, may be measured, weighed and used accurately and according to orders; also that a reliable record be kept of the same. This means that considerable thought must be constantly given to the whole subject. It also means that rigid rules must be made and enforced, that mill discipline be carefully looked after, and proper means provided to carry out orders as given. In short it means that the master's eye, as always, will make the house thrive; or more correctly in this case, will make the mill produce satisfactory dividends. All this because manufacturing cost sheets under such a system will be based upon reliable measurements and weights and records serving as a guide to intelligent management.

We believe in weekly cost sheets that will give the mill management a quick, dependable and frequent survey of the mill operation from a cost standpoint so that losses may be immediately detected and stopped, or so that unfavorable conditions may be quickly and fully realized and remedies applied as far as possible. A daily cost sheet would be even better than a weekly cost sheet. These frequent manufacturing cost records may not be strictly accurate always, as certain averages may have to be assumed, or perhaps a better method is to place a sufficient high arbitrary figure on certain fairly permanent cost items, otherwise the labor of getting out frequent cost sheets might prove to be burdensome. However, these arbitrary figures may be made definitely correct, say, at the end of the bsuiness month or any other longer period that may be decided upon.

The close co-operation of the superintendent with the accounting department will make it possible to get satisfactory cost sheets without any great increase of office help and the value to the superintendent of the information conveyed by weekly cost sheets far outweighs the expense of making them.

We believe, in all cases, that a normal or standard cost figure as to the per ton cost of all the different materials used, power consumed and labor contracted for should be established so that any department therefrom, any decrease or any increase, can be immediately rectified or given its proper place as affecting the cost. Further, these "normals" or standards should be set low enough, in the case of cost or high enough, in the cast of production, so that a real effort will be needed to reach them; and from time to time they should be made higher or lower so that the effort may be continued through changing conditions. A "normal" very difficult to reach today may in a short time be easily reached, through changes in price or an improvement of some kind in machinery or method. So let us keep the normal figure at a point where we can just attain it by real effort, and thus "keep pitching our tents toward the sunrise."

With such a cost system: **Fuel costs**, than which few items are more important, may be kept in check and under live management progressively improved; **power conditions** with the assistance of these manufacturing cost sheets may be kept under close observation, and their fluctuations and serious effect on profit easily shown; losses of stock in manufacture and shrinkages of raw materials, whether they be wood, paper, pulp, rags, or other materials, stand out as vitally significant and when intelligently interpreted should keep the superintendent thoroughly alive to the situation on which the profits of the mill depend; and the cost of machine clothing, as wires, felts, belting, lubricants, etc., when presented as affecting the cost of pulp and paper and shown in dollars and cents, keep all concerned on their mettle to work out an improvement.

Graphic Charts Lend Interest

We feel it should be the superintendent's duty as far as possible to get his foremen interested in the cost of their departments. We hear a great deal, and we think with much force of the deadening effect of routine work. Well! Here is a method of lending a new element of interest to work: If manufacturing cost sheets are used as a guide, and graphic charts made for some of the different departments in a mill, I am sure a gratifying interest and immediate response will be made by all conscientious, right-thinking employees. We have seen the beneficial results of this method. Nothing stimulates men more than to see in "picture" form, if you please, that they are "beating the game." We have seen machine productions increased, lost time decreased, pulpmill losses reduced, and department expenses curtailed or held at a satisfactory normal base figure, just through the interest aroused by graphic charts based on a manufacturing cost system, the charts being posted where the men can see what is being accomplished.

No live superintendent can get interested in dependable, tabulated cost sheets without having a frequent awakening as to the sin of waste and an increased horror as to lack of proper organization. This interest can be cultivated and will lead the superintendent to see waste where he never saw it before—waste of labor, so much of it improperly performed,

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uneconomically and without any regard for the value of time; waste of power, dissipated with little concern as to its cost; waste of fuel through wasteful methods! losses of steam about the plant; losses of hot water; waste of pulp stock, of white water, of lubricants; premature destructions of tools and equipment—all these losses make themselves manifest on a manufacturing cost sheet in dollars and cents if properly interpreted.

Then dirt and especially disorder, so prevalent around the average pulp and paper mill, will also appear as the worst kind of waste, and through realization of these unfavorable factors action may be taken which will go a long way towards making an improvement and helping to secure a profit.

Further, a cost system should be arranged to suit the mill and yet it should not violate good accounting. It should be dependable and, of course, should cover every item of expense and this without too much detail and confusion. We have a vivid remembrance of trying to get a cost system established in a mill some years ago. The accountant, selected from the office of a nationally well-known certified accounting company, installed a system so cumbersome, so full of cross-indexing, and the use of numerous vexatious symbols to represent well known materials and conditions, that we nearly had to shut the mill down to get the system working and keep it working. Consequently, we threw it "overboard" after a fair trial and adopted a system similar to one of our successful competitors. This and other experiences leads us to believe that the adoption of a fairly uniform method of manufacturing cost accounting is greatly to be desired—at least a method based on uniform principles—something that will fit the mill and yet reflect the truth.

It is the "sign of the times" that with changed conditions and world-wide competition before us a more intense interest than ever before has been aroused in relation to manufacturing costs, and the successful superintendent must become more scientific, must insist on more reliable data which, in manufacturing cost operations, he may get most completely through close co-operation with an up-to-date cost accounting system.

Mill Costs from a Technical Man's Standpoint*

By W. G. MacNAUGHTON

Secy-Treas., Technical Association of the Pulp and Paper Industry

THIS joint meeting of superintendents and cost accountants shows the close contact between them that has been achieved the past few years. It used to be that the mill superintendent looked on a bookkeeper much in the same way a dog looks at a cat. If the bookkeeper ventured into the mill he was by no means welcome and was made to feel that his room was better than his company. There may be some concerns still where this feeling exists.

The man engaged in production has come to see that a cost system may be to him as Burke has suggested what the compass and patent log are to the seafaring man. The mill man deals with quantities while the cost man deals with dollars and cents. In large operations the gap between them is filled by a man known as a cost engineer—a sort of hybrid.

Such joint meeting as this helps to develop that spirit of cooperation so necessary between the men represented in the associations. The cost man is dependent in the final analysis on the mill for the quantities of material used in production, the labor, power and other items. From these by extending the unit value he gets his dollars and cents. On the correctness of the quantity figures depends the correctness of the cost.

In too many places it is the chief desire to preserve uniformity of figures from day to day and from month to month. To preserve this uniformity and avoid comment the practice is to adjust the figures—doctor them—thereby destroying the chief value of a cost system—its correctness.

The fault in such a practice does not lie primarily with the mill man but frequently with the management which insists on narrow fluctuations in the cost records without going to the bottom for the reasons of such fluctuations.

It is plain that if adjustment of the inventory figures is to be made, the place to do it is in the office, but in doing so at all the cost system is shot to pieces.

The Cost Association has done a conspicuous piece of work in developing a uniform cost system, but its successful application depends to a considerable extent on the mill and on the plant organization.

If I were a manager, superintendent or cost accountant, I would want to know the cost of the product both in terms of quantities and in terms of dollars and cents and so divided as to show the efficiency and cost of each of the main departments.

One of the great difficulties in paper manufacturing today of getting costs is the measurement of the quantities and keeping track of the inventories. In most mills there is too much guess work and in many, even those with cost systems, the work might as well be done in the office.

Taking a mill using wood and making its own sulphite, mechanical pulp and paper therefrom, it is well known that too often there is nothing but guess work between the wood pile and the finishing room. At the woodpile those who have studied the present methods of wood estimation know to what extent it too is a guess. Another large item entering into the cost of paper is the fuel, and in many mills, too, there is a guess on the coal pile, and generally a poor guess the rest of the way through.

You will agree that the vital element in a true cost system is the accuracy of the quantities. The technical man or engineer must bring his training and experience to bear on this question to assist both of you.

Power Plant

Let us take the fuel first. The fuel, if oil, can be measured—where coal alone is used, properly equipped power plants have scales to give a record of the coal used. The difficulty usually comes where woodroom refuse is burned in the boiler house. This is frequently not accounted either in charging the boiler house or crediting the wood preparation department.

The power plant should be run as an independent department of the mill charged with the fuel, labor and maintenance and credited with the pounds of steam and power developed. The output of steam and power should be capable of distribution by flowmeters and wattmeters to each department of the mill.

My contention is that such a mill as we are considering should be divided into at least the following departments: Wood preparation, sulphite, mechanical pulp, bleach plant, power plant and paper mill. When we come to the wood there is work to do to get a unit of measurement applied that will represent the actual quantity of material. The stacked cord of 128 cubic feet is reasonably accurate when used as it was on fuel wood. There the wood is cut to four-foot lengths and split to uniform size. When applied to pulpwood of all lengths from two-foot lengths to 16-foot logs and diameters of 3 inches to perhaps 48 inches the inaccuracy of such a unit is plainly seen.

Log scale in board feet is little better. The use of the weight as a system of measurement has been ardently advocated, but I am inclined to believe that the practical difficulties in application except perhaps in the mill are insuperable. A system to which I am favorable is the solid cubic measure of the wood. It is in general use in Ontario, parts of Quebec, in Scandinavia and to some extent, I believe, by New England mills. It is true that the pulp yield will vary with the specific gravity of the dry wood. This variation in specific gravity usually depends on the locality or species of wood. This variation could be used to govern the purchase price.

The solid cubic measurement can be used uniformly from the woods to the mill quite as readily as the log scale measurement is now used by lumber mills. Instead then of continuing the term *cord*, as is done even in Ontaria, I would discard it for the solid cubic measure with the unit of pulp wood as 100 cubic feet.

Wood Preparation Department

As the wood room supplies chips to the sulphite mill and cleaned wood to the mechanical pulp mill, its raw material input is the solid cubic measure of rough wood and its output or product the chips and prepared wood.

The most satisfactory method of recording the output so far as chips are concerned is undoubtedly the use of the weightometer, a conveyor scale. This, with the moisture test of the chips to the chip bin, would give the bone dry weight of the raw material to the sulphite departments. A similar weightometer and test on the conveyor for the refuse from the wood room to the boiler house would give the figures to make the proper debit and credit between the departments and to check the shrinkage in preparation. The prepared wood to the grinder room would most readily be had by solid cubic measurement.

Sulphite Mill

In this the yield of pulp when it is not weighed but slushed

* Address before joint meeting of the Cost Association of the Paper Industry and the American Pulp and Paper Mill Superintendents' Association, Kalamazoo, Mich., June 2, 1922.

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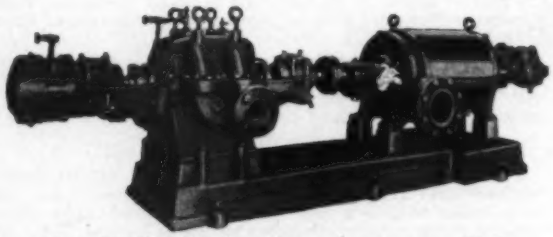

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in whole or in part to the paper mill is obtainable only by the use of a consistency regulator and a stock meter. Too frequently the sulphite mill production is calculated from the number of digesters blown and the yield factor based on an estimation of rough wood supplied to the wood room. The proper factor would be percent of pulp on dry weight of the chips cooked. Right here I would also advocate discarding for mill practice at least the "air dry" calculation, using in all cases the dry content, or otherwise known as the bone dry. The steam used should be measured by flowmeter. The sulphur and limestone or lime being bought by weight and used in the same basis should give no particular difficulty in getting correct figures if ordinary care is used. It is safe to say, however, that many sulphite mills have no adequate system in regard to the inventory of these materials and periodically have to "gulp down" large shortages.

Mechanical Pulp Mill

In this department with the dry weight of wood delivered and a similar figure computed from the measurement of the stock produced, the yield of pulp would be based on the prepared wood received. The chief items entering in are the prepared wood, power, labor and maintenance.

Bleach Plant

Even in mills making all their sulphite in bleached form I hold that this department and the sulphite mill should be kept separate in order that the efficiencies of the two are not confused. Here the input is the weight of unbleached sulphite, the chloride or bleaching powder, steam, labor, power and maintenance, while the output is the bleached product. The case is frequently seen where the rough wood is at one end and bleached sulphite at the other, thereby confusing the three logically separated departments—wood preparation, sulphite mill and bleach plant.

Power Plant

I have dealt with this already and fortunately the tendency nowadays is to regard this as a manufacturing department producing steam and power for distribution from fuel and water.

Paper Mill

One of the bones of contention usually found between the mill and the office is the yield of paper from the materials furnished. In plenty of mills there is only one quantity known approaching accuracy—the paper made and the materials used are calculated back from it. Then the inventories of sulphite and mechanical pulp are adjusted in accordance, and in many cases this calculation covers even the production of the pulp mills.

These are facts with which you are all more or less familiar. It is only by the employment of apparatus such as consistency regulators and stock meters that the quantity of pulp supplied in slush form to the paper mill can be arrived at with reasonable accuracy. Even when weighed there is difficulty on account of inadequate moisture tests systems and care in weighing.

Besides computing the cost of paper and the product of each of the departments I have named in dollars I would have corresponding factors based on quantities.

Wood Preparation

The cost record of this department based on quantities should include such factors as: Percent shrinkage in preparation on rough wood; man hours per unit of prepared wood; horsepower hours per unit of prepared wood.

Sulphite Mill

Percent yield of unbleached sulphite (not screenings) based on prepared wood; percent screenings on sulphite produced; pounds steam per ton sulphite made; pounds sulphur per ton sulphite made; pounds limestone or lime per ton sulphite made; man hours productive labor per ton sulphite. All figures based on bone dry content.

Mechanical Pulp

Percent yield of mechanical pulp based on prepared wood; percent screenings based on mechanical pulp produced; horsepower hours per ton pulp produced; man hours (productive labor) per ton pulp produced. All figures based on bone dry content.

Bleach Plant

Percent shrinkage based on unbleached sulphite; percent yield of bleached pulp based on unbleached sulphite; percent of bleaching powder or chlorine per ton unbleached sulphite; pounds steam per pound bleached sulphite; man hours (productive labor) per ton bleached sulphite. All figures based on bone dry content.

Power Plant

The factors covered by the standard record of a power plant.

Paper Mill

Percent fibre constituent and filler based on finished paper; percent shrinkage; pounds steam per ton paper made.

By subtracting the heat returned to the boilers in the condensate the net heat used in drying per pound paper made.

By computation of water evaporated in drying the heat units used per pound water evaporated against the theoretical heat required get the drying efficiency.

Man hours per ton paper; horsepower hours per ton paper; pounds alum per ton paper; pound size per ton paper; pounds paper per pound felt; pounds paper per pound or per square foot wire, and various other factors as may be required all based on an analysis of the cost figures.

In logging operations or in a saw mill the figure of most value to the superintendent is the thousand feet per man or per team per day, rather than the cost in dollars. In some paper mills there is what is known as the statistical department, not connected with the accounting department, so that there is no conformity of the two departments' figures.

In the investigation begun on drying of paper we found that various mills had different systems by which comparison might be made but the nearest any came were two or three that had the steam per pound paper made. Some two or three made use of a factor entirely unrelated to cost, the pounds paper dried per square foot drying surface per hour.

The cost system along the lines I have mentioned is probably no different from that you are accustomed to operate, but I have given it if only in order to bring it before you.

In the paper industry the men dealing with accounting matters should know the steps in the process with which the figures deal, so that they need not take the figures blindly. The superintendent and men in the mill need to realize the value of cost records in order that they may be impressed with the need for accuracy. The engineer by training along analytical lines and by his knowledge of appliances should be in a position to assist both of you towards accurate process records and to obviate otherwise unrecognized errors.

In the case of up-to-date power plants they are now not regarded as fully equipped unless provided with steam flowmeters, water meter and coal and ash scales as well as control instruments. The same is true of the sulphite mill in the case of control instruments such as temperature and pressure recorders. While consistency regulators and stock meters are used to some extent in newsprint mills they are not by any means commonly used. Undoubtedly the time is not far distant when they will be regarded as part of the necessary equipment to be provided. The same is true of weightometer or conveyor scales.

Notes on the Production of Half-Stuff from Waste Papers*

E. G. MILHAM, Chem. Engr.
Bryant Paper Company

AS practised at the present time, the production of half-stuff from graded waste papers may be divided into four distinct operations, namely;—sorting, dusting, cooking, and washing. The first two operations have become pretty well standardized and will consequently receive comparatively little attention in this paper. However, the last two processes, cooking and washing, are in a state of rapid development and are entitled to considerable attention.

Sorting

The sorting operation involves the inspection of stock going into the process and the removal of undesirable foreign materials and of papers containing ground wood or other unbleachable fibres. In addition to this, it involves the blending of the sorted papers in such a way that the papers in different cooks will be as nearly uniform as possible. For example, colored papers or papers carrying a large amount of solid inks are blended with white papers carrying comparatively little ink so that the resulting mixture will represent as nearly as possible the average run of papers.

At present, there are two methods of sorting, known respectively as the screen method and the carrier method. In the former, the papers are thrown from the bale into a 4'x6' box provided with a heavy screen bottom, and sorted from this box into barrels. The barrels are then trucked from the various screens to the dusting or shredding machine. The advantages of such a system are very apparent and may be summed up briefly as follows:

1. It makes it possible to put the sorting on a piece-work basis.
2. It enables the foreman to check up on each sorter, since

*Address before the annual convention of the American Pulp and Paper Mill Superintendents Association, at Kalamazoo, Mich., June 1, 1922.

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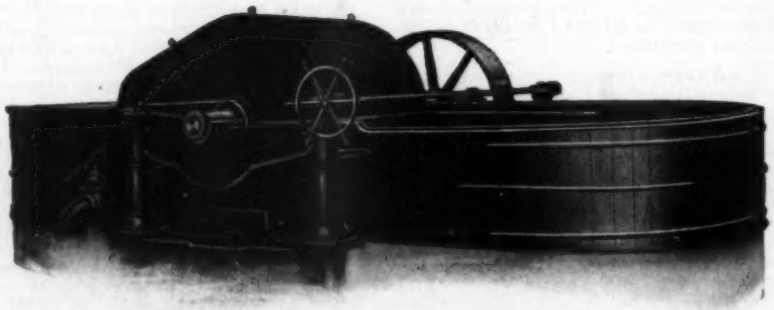

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the sorted papers are again looked over as they are fed into the dusting machine.

3. It makes the proper blending of stock a comparatively easy matter.

4. It enables the sorting room to run continuously and without interruptions caused by temporary shutdowns of the dusting or cooking departments.

5. It makes it possible to do the sorting in parts of the room where the best light is available.

6. The resultant of these five advantages is cleaner sorting, better blending, more uniform half-stuffed and cleaner paper.

The disadvantages of the screen system are:

1. Excessive labor costs.
2. Excessive space requirements for both screens and barrels.
3. Excessive wear on floors.

In order to overcome these very serious disadvantages, many mills have discontinued the screen system and have adopted the carrier system. The latter consists of sorting directly from the bale onto a belt conveyor or carrier which is attached to the dusting machine.

The advantages of this system over the screen system are:

1. An enormous saving of labor, often amounting to six to eight cents per 100 pounds.
2. Greatly decreased floor space.
3. Greatly increased output per sorter.

Among the disadvantages of the carrier system we have:

1. Careless sorting, since no checkup is possible.
2. Frequent interruptions of the sorting, due to clogging of dusters, temporary shutdowns, etc.
3. Excessive rushing to make up time lost by interruptions.
4. Little opportunity to blend different types of papers properly.
5. Dirtier and less uniform paper.

Upon summing up the advantages and disadvantages of the two systems, there can be little doubt but that, from a quality standpoint, everything is in favor of the screen system, and that from a cost standpoint practically everything is in favor of the carrier system. There can be little compromise between the systems. The screen system is unavoidably expensive, and the carrier system, by its very nature, does not lend itself readily to careful sorting and blending. The whole subject of sorting systems becomes a question of whether quality shall be somewhat sacrificed in order that low costs may be obtained. The proper answer to this question is obviously up to the management of each individual mill.

Dusting and Shredding

During recent years many paper mill superintendents have discovered that the so-called dust removed by the various types of dusting machines is composed largely of perfectly good fiber. This has led them to believe that there is such a thing as overdoing the dusting operation, especially in cases where finely torn papers are not required by the cooking process. In the case of the rotary and vat cooking processes, which are by far the most prevalent today, it is only necessary that the stock be opened up and that the heavier stitches be broken. Consequently, where these processes are in use a very slight shredding and a light dusting in a fan duster is about all the preparation which a stock requires before going to the cookers. As a matter of fact, in many book mills where heavily stitched stock is not used, it is customary to sort the stock directly into the cookers without any preliminary treatment at all. This, however, is not a safe practice and should not be followed unless exceptional stock is used.

Cooking

The cooking process, as you all know, consists of treating the stock with soda ash in such a way that the ink, size, etc., in the papers are saponified or rendered soluble so that they may be washed out with water. At present there are three distinct processes which are accomplishing this work. These are: The Vomiting Tub Process, the Rotary Process and the Vat Process. As these processes are rather interesting, they will be dealt with in some detail.

Vomiting Tub Process

In cooking papers by the vomiting tub process, the sorted papers, which have been dusted and torn very fine, are thrown into a specially constructed tank of about five thousand gallons capacity. This tank is provided with a perforated false bottom and a six-inch vertical spray pipe, arranged in such a way that hot soda ash liquor may be intermittently sprayed over the papers in a manner similar to that of the ordinary coffee percolator. The hot liquor sprayed onto the papers at the top of the tank gradually trickles down through the papers and through the false bottom of the tank, whence it is again forced up through the spray pipe by means of a steam injector provided for the purpose. During the cooking period, which lasts from eight to fifteen hours, the stock is sprayed six to ten times per minute with the hot liquor. At the end of this period a simple hoisting mechanism is attached to the spray pipe, which in turn is attached to the false bottom of the tank, and the entire six or seven thousand pounds of cooked papers is gradually raised from the tank. The papers are then forked by hand into carts and hauled to the washer room, where it is necessary to fork them into the washer.

The advantages of this process may be enumerated as follows:

1. The original investment is very small.
2. The space required is very small.
3. The consumption of soda ash is moderate. (About 6% for book stock.)
4. The steam cost is low, since it is necessary to heat only two pounds of water per pound of stock cooked.

To counterbalance these slight advantages we have the following:

1. Enormous labor costs, which are three to four times that of the rotary or vat processes.
2. Constant danger of poor cooks, due to faulty manipulation.
3. A dirty, wet and steam-filled cooker room.

These very serious disadvantages are rapidly making the vomiting tub process obsolete.

Rotary Process

In the rotary process the sorted and dusted papers are put into a horizontal cylindrical boiler about 9′ dia. x 25′ long. Water is added in the ratio of about two and one-half pounds of water per pound of stock, and the required amount of soda ash solution is added. The manhole covers are then put in place and the stock cooked at about 30 lbs. steam pressure for six to ten hours, while the boiler is rotated at a speed of ½ to 1 revolution per minute. At the end of the cooking period the pressure is relieved, the manhole covers removed and the rotary again revolved until the entire twelve-thousand-pound charge of papers has run thru the manholes into a hopper-shaped pit, located directly beneath the rotary. From this pit the stock is pumped directly to the washer.

This process has many advantages, namely:

1. The labor cost is about one-third that required by the vomiting tub process.
2. The process is very nearly fool-proof.
3. It avoids the necessity of tearing papers up fine, which results in lower dusting costs and losses.
4. It provides a clean, dry and practically noiseless cooking department.

The disadvantages of the rotary process are:

1. A rather high first cost.
2. A rather large space requirement.
3. A higher steam cost than the vomiting tub process, since more water has to be heated to a higher temperature.
4. A sudden draft of steam at the beginning of the cook.
5. Somewhat higher power costs than the vomiting tub process, since everything is pumped rather than handled by hand.

In spite of these few disadvantages, the rotary process is giving very good satisfaction, and there can be little doubt but that the rotary process can cook paper stock just as economically and well as any other process in general use at the present time.

Vat Processes

Under the head of vat processes can be included all those which cook at 5 to 8% consistency. In these cases the sorted and dusted papers are put into tanks provided with agitators, or into special cooker-beaters provided with tight-fitting covers. The required amount of water and soda ash is put into the cooker and the steam turned on. By the time the required amount of papers have been added, the temperature is very near the boiling point. The temperature is maintained near the boiling point for about an hour, which is sufficient cooking time for most classes of paper stock. After the cooking period has been completed the stock is pumped to a storage tank, to the washer, or to a special defibering apparatus, which will be mentioned later.

The advantages of the vat process are as follows:

1. Extremely low first cost.
2. A slight saving in labor over the rotary process, since practically no labor is required to load the vats.
3. A saving of about 25% of the soda ash required by the rotary process, since the high dilution promotes contact between the soda ash and the papers.
4. A stock is produced which is easier to defiber and wash than rotary stock.

The disadvantages of the vat process are as follows:

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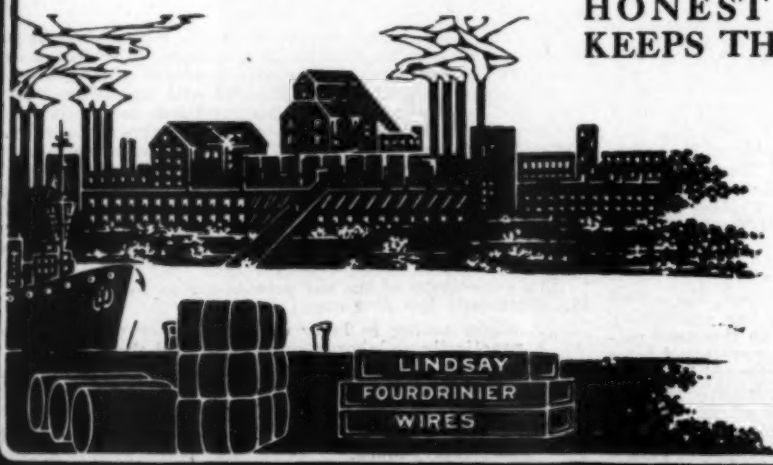

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Collinwood Sta., Cleveland, Ohio

"Ask any Papermaker"

1. An enormous amount of steam required, since it is necessary to boil sixteen pounds of water for every pound of papers cooked.
2. A large storage space is required if sorting room is run only eight hours per day.
3. The process is not as fool-proof as the rotary process.
4. Less uniformity is obtained, due to the fact that it is necessary to cook smaller batches than in the case of the rotary process

It will be noted that the high steam and storage costs are very serious disadvantages—in fact, these very disadvantages are enabling the rotary process to compete with the various vat processes very successfully at the present time.

Washing

By far the most interesting phase of paper stock treatment is that of defibering and washing the cooked stock. At present there are three distinct processes for doing this work. They are: 1—Processes where defibering and washing are carried out in one operation; 2—Processes where defibering is carried out in a separate unit and washing is accomplished by means of an improved intermittent type of washer, working on the principle of progressive dilution; 3—Processes where defibering is carried out in a separate unit and washing is accomplished by means of a continuous washer working on the principle of alternate dilution and extraction.

1.—The Beater Washer

As the name indicates, this washer is an ordinary beater provided with drums for extracting dirty water. Clean water is added in front of the roll, is mixed with the stock as it passes under the roll, and is extracted behind the roll. It will be noted that the beater roll performs the triple function of circulator, mixer and defiberer, which may or may not be advantageous—in fact, about the only advantage which can be claimed for this type of washer is its simplicity.

The disadvantages of the beater washer are many and varied. They may be summed up briefly as follows:

1. The power consumed is very excessive, often amounting to 200-horsepower hours per ton, or about fifteen cents per hundred pounds of paper.
2. The amount of water used is excessive, since it is only partially mixed with the stock before it is extracted.
3. The beater roll tends to grind the dirt into the sock, which makes complete washing very difficult.
4. The original investment is necessarily very high, since one 2,000-pound washer will handle only four or five tons per twenty-four hours.
5. The floor space required per ton per day is excessively high.

It will be noted from the above comparison that nearly everything is against the beater type of washer—in fact, it is quite probable that within a very few years this type of washer will become obsolete.

2.—Intermittent Washers for Defibered Stock

This class of washer has been developed because of the fact that fully defibered stock can be washed more rapidly, completely and economically than semi-defibered stock. To accomplish this many clever devices have been developed for defibering cooked stock more or less completely. Some of these devices do the work by violently churning the stock in a closed space by means of impellers driven at high speed. Others achieve the same result by discharging the stock at a high velocity against a slightly roughened baffle plate. Still others accomplish the desired result by discharging a stream of stock at high velocity against an opposing stream of stock, also discharging at high speed. Of course there are multitudinous claims and counter-claims for the various types of defibering apparatus. However, it has been the writer's experience that from the standpoint of economy and quality of output, there is very little difference between the three types of apparatus.

There are many types of intermittent washers for handling completely defibered stock. However, they are all practically identical in principle, so it will be necessary to describe only one of them here.

The Herrbold-Keelan Intermittent Washer

The Herrbold-Keelan washer consists of a rectangular extracting box containing four regular washer drums, a horizontal cylindrical chest located directly beneath this box, and a pump for circulating the stock. When operating, hot stock from the defiberer is pumped into the front end of the extracting box, where a large amount of dirty water is extracted. By the time the stock reaches the rear of the box it is quite thick and still very hot. From the rear of the box it falls into the horizontal chest of about 6,000 gallons capacity, where it is thoroughly mixed with clean water by means of the agitator provided for this purpose. The stock, mixed with fresh water, is continuously pumped from this chest into the front end of the extracting box. This process of continuous dilution and extraction is continued until the entire three thousand pounds of stock in the batch have been washed. The washing operation with this type of apparatus requires from 35 to 50 minutes. The advantages of this type of washer over the beater type are as follows:

1. An enormous saving of power, often amounting to 100-horsepower hours per ton, or about eight cents per hundred pounds of paper.
2. A saving of one-third to one-half of the water required by the beater type of washer.
3. A bright, clean stock, since none of the dirt is ground into the fiber, and since a large proportion of the dirt is removed from the stock while the latter is still hot.
4. A very small investment is required, since only a few units are needed.
5. Extremely small floor space is required per ton per day.

The disadvantages of this type of apparatus are as follows:

1. It is by no means as simple or fool-proof as the beater type.
2. There is an ever present danger of dead spots.
3. There is an ever present danger of lumps or blocks, due to an occasional failure of the defibering apparatus. Experience has shown, however, that this is not a serious drawback if proper precautions are taken.

It will be noted that the advantages of this type of apparatus far outweigh the disadvantages—in fact, it is quite possible that a washer of this sort may some day take the place of the beater-washers, which are very largely used at the present time.

3.—Continuous Washers

This class of washer is designed on the principle that maximum washing efficiency can be obtained only when perfectly defibered stock is greatly diluted and completely extracted several times in rapid succession. The so-called Lancaster washer is the most interesting example of this type. It consists of three or more ordinary deckers or thickeners set up in series, with a diluting and mixing tank located between each one. When operating, hot stock from the defiberer is diluted to about 1% consistency and pumped to No. 1 decker and thickened. The thickened stock falls into No. 1 diluting tank, where it is again diluted and thoroughly agitated. From here it passes successively to No. 2 decker, No. 2 diluting tank, No. 3 decker, and stock chest or bleacher.

The advantages of this type of washer are as follows:

1. A continuous process with a minimum consumption of power, labor and water per ton of pulp.
2. Pulp of an extremely bright color.
3. Very small floor space per ton per day.
4. A moderate investment.

The disadvantages of this type are:

1. It is rather complicated.
2. It is hard to control.
3. Separate bleachers and bleach washing units are required if it becomes necessary to bleach the stock.

It will be noted that while the continuous washer is ideal theoretically, it has several practical disadvantages which will greatly hinder its general adoption by paper mills.

Summary

In summing up the above paragraphs, it is possible to draw the following conclusions:

1. If a quality job of sorting is desired, it will be necessary to use the screen system of sorting, even though it may cost a few cents more per hundred pounds.
2. Except in cases where the vomiting tub process is used, violent dusting should be avoided.
3. At the present time the rotary and vat processes are running about neck and neck so far as economy and efficiency are concerned.
4. The beater type of washer is both wasteful and inefficient.
5. There is still a tremendous amount of room for improvement in the processes used for producing half-stuff from waste papers.

Richard Knott in Control of Crescent Paper Co.

Richard Knott will assume the presidency of the Crescent Paper Company of Marseilles, Ill., the place vacated by the death of his father. The younger Mr. Knott was given many years of special training for just such an emergency as the present, and he possesses many of the excellent qualities of his father. The Crescent mills, therefore, will operate as if the founder had not passed away, a provision which he wisely made while still enjoying good health.

Safety bulletins on shop bulletin boards help develop the safety habit among workmen. Some plants have reduced accidents 75 per cent or more.

This bulletin, 17 in. x 23 in., printed in bright yellow and a deep, rich purple, is but one of 36 safety bulletins distributed to members last month.

Write for sample Bulletins to try in your plant

Write for sample Bulletins to try in your plant

FATHERLESS!

Isn't there an appeal in this bulletin?

This family is but one of thousands, deprived of its breadwinner, left to struggle on in poverty.

The father was merely one of the 22,000 persons killed in industry last year—each accident leaves in its wake suffering and privation—often, widows and orphans.

HOW ABOUT YOUR PLANT?

Were there children left fatherless because of fatalities among YOUR workers?

Wouldn't it give you a thrill of satisfaction if you were to go farther than the mere requirements of the law—if you were to do every possible thing to safeguard the lives and limbs of your workers and could thus prevent such scenes of distress as that pictured by these two helpless children?

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How the Superintendents Are Benefited by Cost Reports Based on Accurate Manufacturing Data*

By JAMES A. REILLY
American Writing Paper Company

A SUPERINTENDENT was recently asked two questions by the president of his company before he would approve the request for an appropriation for a safety screen and guard rail around an exposed gear where his men had occasion to pass several times during the three tours:

First: Why is this safety device necessary?

Second: Is this safety device foolproof, and are you sure it will prevent all accidents at this plant?

The superintendent replied as follows:

To the first: A—Will reduce number of accidents. B—Protect my men from loss of life and limb. C—Reduce the number of hours of lost time of employees—due to accidents. D—Minimize the hardships that usually accompany accidents to employee and family. E—Reduce the cost of accident insurance to the company.

To the second: A—I have yet to see a safety device that is absolutely foolproof, yet this safety screen is necessary because it serves as a warning that this is a danger spot, and it is entirely up to the employee to take heed and keep outside the danger zone. Moreover, we must have it. Insurance companies insist that we have it, and regardless of practices years ago, things are different today; therefore, we consider it as imperative.

I was very much interested in this case, and often thought: What would the superintendent of today say if the president should substitute the phrase, "cost system" in place of "safety work" as follows:

First: Is it necessary that we have installed in our mill a practical cost system?

Second: Will that practical cost system prevent waste, reduce cost, increase efficiency, and increase our profits; if so, how?

There is no doubt in my mind but that, if the above questions were put to paper mill superintendents fifteen years ago, the majority would have replied in the negative with a few unsolicited remarks regarding the cost man, as follows:

The cost accountant is: 1—A d——n nuisance! 2—A red tape artist. 3—A spy for the boss. 4—Knows nothing about the paper business. 5—An added overhead expense that the mill will have to absorb.

Perhaps the superintendent was justified in forming his opinion as thus related. I must admit that personally I know of cases where the cost man has been at fault. A mutual friend, the president of the company, has explained the workings of both sides, and bridged the gap of misunderstanding with planks of harmony and co-operation. We know that, as a natural result, today where a better understanding of manufacturing conditions is known, close bidding and competition of the cleanest kind have a tendency to increase business relations of like manufacturers rather than did former acts of piracy toward one another; so likewise does this good feeling exist between executives and heads of departments, within each organization.

What Can Cost System Produce?

Now, what good results can a practical cost system produce that will really assist in the problems of the real works—the manufacturing department? By a practical cost system we mean one that is based on accurate and continuous reports, and which, when summarizing the daily records for the monthly or periodical closing, gives results that balance with the commercial books, bearing out a term often applied to cost work as "tying in with commercial books."

We are not in favor of what is often spoken of as a "hit or miss" cost system—getting records today and then not again until someone desires certain information about an order and having the cost man or accountant ascertain the facts. Results obtained by means of this "hit or miss" system are not accurate. They do not tie in with the commercial books; they are dangerous to use, and are often misunderstood by those who must interpret them.

Continuous cost records are as essential as the accurate reporting of all shipments. You would hardly think of requesting your shipper to report to your office only part of the shipments; you even go a step farther and take double precaution to see that all that goes out is recorded correctly for billing purposes, and this you do by using records of shipments that are numbered consecutively, and by having a check to see that all records of shipments are properly accounted

* Address before joint meeting of Cost Association of the Paper Industry and the American Pulp and Paper Mill Superintendents' Association, Kalamazoo, Mich., June 2, 1922.

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Application of Cleveland Worm Gear Reduction Unit to Paper Screen drive in paper mill

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Consider that we offer constant efficiency during entire life, even torque, freedom from vibration, compactness, simplicity (only two moving parts aside from bearings), low maintenance cost, and ease of lubrication **plus** "no trouble," then write us your requirements. Our engineering department is at your service.

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for. You also operate perpetual inventory records and check periodically by physical inventories to see that your records are properly maintained. So likewise, with continuous cost reports—they are summarized and are balanced with the figures of the accounting department for the same purpose; as in checking perpetual inventory records with physical inventories—namely, accuracy.

Cost Reports vs. Safety Signals

You would not consider it practical for the superintendent to remain at the exposed gear for 24 hours a day for the purpose of preventing accidents to his employees, so you install some kind of a safety device to answer the same purpose when he is elsewhere; so is it with cost reports as with safety devices; they serve to render information of his various departments, telling what has taken place when he is in other parts of the plant.

Rag Room

A bleach of rags comprised of various lots possibly has all the outward appearance of being up to standard, but when the bag department starts sorting it runs into an excessive amount of dirt and finds that hooks and eyes have to be removed along the cloth covered metal rings, and various other undesirable elements that increase the labor cost of putting on the bleach.

Excess fare is also an item of cost if not charged back to vendor. You might say that our rag department foremen have all this dope. Yes, no doubt of it, but we will go a step farther and put the results into dollars and cents from baled rag to half stuff, not only items of direct labor, but overhead as well, and the total figure might be of such importance that you will make further investigation with very beneficial results to the company. Take the case of substitution, one rag for another, or possibly the use of cotton linters. Cost reports will itemize the difference in actual cost, whereas the Mullen tester or other testing devices, together with your practical knowledge, will merely measure the difference in physical qualities.

Difficulties often arise in carrying out your instructions in the rag room. Occasionally, the rag foreman, with an impunity due to long number of years in your employ, ignores your instructions, possibly not intentionally (he may not have clearly understood your desires), and when you put the questions to him regarding this particular bleach, replies that all is O. K. You feel satisfied until the cost reports come through, and you find that he has followed his usual routine rather than to make the changes you suggested. Let your cost reports be your safety device on matters of this kind.

Beater Room

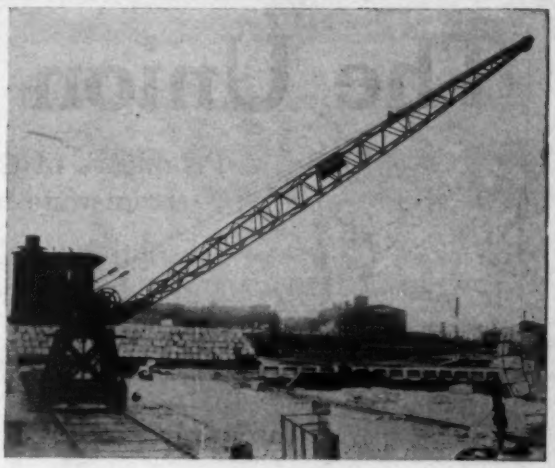
You issue specific instructions as to materials and amount to put into each beater. If the beater man reports material correctly, we cost men will tell you whether or not he is doing it according to orders. Now, suppose he reports as per orders —all beaters furnished the same, but actually varies the furnish. Our double check system, by means of inventory, will show variances; and such variances are indications that your orders are not being executed properly, probably more paper is being made than the weight of material reported as used, or possibly 20 percent beater shrinkage is shown on an order; that is not correct. Finally, men, we will assist you in hammering the sales department to secure larger orders—to discontinue the small one and two beater orders, especially on colors, by showing the large loss to the man who is interested in the "dollars and cents" of his company as well as "services" —the president. Let us be your safety device in the beater room.

Paper Machine

The cost of operating a paper machine varies from $5.00 to $75.00 per hour, depending, of course, on size and hitch up, and company organization. You will admit that there is something else figured in besides labor to bring the cost per hour to these figures. If we carefully analyze these cost figures, using a common unit as "per hour"—"per hundredweight of paper"—"per day"—or "per month," and set up a comparative report whereby you can judge for yourself whether your men are as productive as they should be, or possibly whether the change in make of felts and wires was advantageous or not, and finally, whether the increased speed of 10 percent or 20 percent was not offset by higher operating cost or perhaps more broke. Will you let the cost reports be your safety device in the machine room?

Finishing Room

Some finishing rooms are complicated—some are not—but the average machine tender will say that the employees of the finishing department are past masters in the art of "pass-



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Every pound of wood pulp that goes into the Tidewater Paper Mills at Brooklyn, N. Y., must be handled by one of their two Brownhoist locomotive cranes. These cranes must be kept going to keep the plant operating.

In the five years they have been in use, these cranes have not broken the faith their owners placed in them. About 87,500 tons of wood pulp are handled per year at a cost of 15 cents per ton. Service of this kind comes only in well built cranes, and Brownhoist cranes are well built.

Many paper companies are cutting costs today by handling their coal, pulp and other materials with a Brownhoist. We believe our catalog K on locomotive cranes will interest you. May we send you a copy?

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ing the buck." We make good paper and they spoil it, although the damage, according to the finishing department, must have been caused by poor rolls, etc., that were made on the machine. No matter who's at fault, the company's the loser, yet how much? With the aid of cost reports, the loss is ascertained, and this the superintendent must explain to his superiors. What a wonderful incentive the superintendents have here to hold before their foremen to prevent manufacturing mistakes in the future? Again, what about your various finishing processes, different weights with different finishes? You surely know that on many an order the profit was wiped out on account of excess broke or excessive cost of finishing operation, due to light weights and through trying to obtain a finish to match samples.

We will put your argument up to the sales department in actual figures, then if they insist on accepting duplicates of these unsatisfactory orders, you need have no fear or worry about them. You have done your best, gone on record, and will receive the support of the cost department if it is necessary to have a "show down"—an excellent place to use your cost department as a safety committee!

Boiler Plant

The reports turned in by the fireman, water tender, or engineer, contain valuable information from an operating standpoint, but upon investigation, you frequently find the facts of the case have not been fully represented. You are somewhat at sea, and hesitate before making your decision. Why not let us give you a combination report of production and cost, with statistics showing distribution of steam by departments; production of paper by departments; quantity of steam used per cwt. of paper, together with cost of steam, percentage of ash, efficiency of boiler plant, etc.? Your cost man will co-operate with your engineering department to get the data necessary to incorporate in a really practical and useful boiler and steam plant report.

Installation of New Machinery

In these days of scientific investigation and wonderful progress that is being made in manufacturing equipment, you are constantly on the lookout for a chance to increase the efficiency of your plant. If you are located in a valley where you are subject to shut-downs due to water conditions, it might be to your advantage, both from a practical and financial standpoint, to consider the installation of electrical equipment or steam equipment for auxiliaries. If some large electrical concern should send their engineers to your plant to investigate the cost of installation of new power equipment, the first question that they will ask is: "What does it cost to operate and furnish your power today?" If you have no figures available, then, they will determine, in their own way, what it is costing you, and knowing full well that they have something to sell, will endeavor to present a more or less biased report, especially attractive from their viewpoint. Is it not much better to have your own figures available for this comparison?

Service from Vendors

A short while ago an oil concern sent its experts into a plant for the purpose of showing where they could point out to the owners a great saving in oils. The report on lubrication submitted by the oil concern clearly showed that the investigation was warranted. The same grade of oil was not consistently used on the same piece of equipment. Oftentimes a 50c oil was applied where a 25c oil was the better oil to use, and on the other hand, the oilers lubricated with a cheap oil expecting good results where a more expensive oil was the proper grade to use.

If that plant had installed a practical cost system and had reported the consumption of oil by departments, undoubtedly the cost man would have discovered this practice of using different oils on the same equipment, by comparison of requisitions and cost. Such comparisons would have prompted investigations either by an oil expert or by the engineering department which would have developed results involving great savings to the company.

Need for a Safety Device

Another case that I remember distinctly was when we called the attention of the superintendent to the fact that on bleaches of rags that were cooked, the same quantity of lime, soda ash, etc., was used in a half boiler as in the full boiler. Upon investigation, we find that the man who had always taken care of the filling of the boilers, stated that he was told when he came there ten years ago, to put in a certain formula, and he carried out that formula regardless whether the boiler was full or only partly filled.

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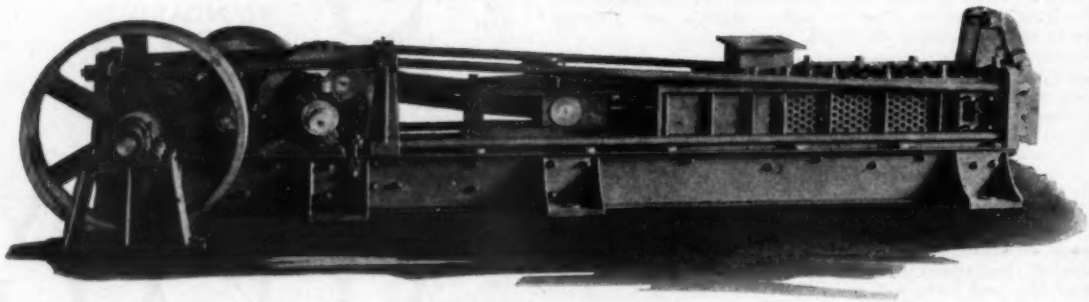

This machine, driven by a 25 H. P. motor, presses wet spruce bark 52% bone dry, and wet hemlock bark 49% bone dry. This refuse is thereby turned into a good, usable fuel.

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Paper Mill Machinery, Iron, Brass and Sulphite Bronze Castings

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Automatic Collapsing Reel

Type "E"

A heavy type Reel intended to be placed behind waxing machines, supercalenders, or other machines where a large roll is converted to reel at one time and cut into sheets. The reel then swung over ready for another roll. The roll already wound is then taken from reel while other is winding. Swinging of the reel is operated by worm and gear by engaging clutch, controlled by hand lever. Made in any width and for any thickness of paper. Write for catalog, PAPER MACHINERY.

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3

Cost Reports as Safety Devices

I am not criticizing the superintendent in this particular case, as he had explicit confidence in the man, and not being around at all times when the boiler was being filled, he had no means of checking up. It is not possible for the superintendent to be at the plant 24 hours a day. Who is going to take the superintendent's place during his absence? It is true that he has assistants, and has confidence in the assistants, but it is also impossible for the assistant superintendent to be everywhere in that plant at the same time, consequently, mistakes are made and possibly are not being called to his attention.

You will say: How is it possible for the cost man to give this information to the superintendent? Here is the answer: In operating a set of cost books, the total charge for expenditure of everything pertaining to the plant is charged by the accounting department to the cost controlled account. It is necessary, then, to have the distribution of these items of expense, and through the channels of a properly organized cost system, such as reports of the material consumed in beaters, requisitions of general supplies, a correct distribution of the payroll, checking with the clock records, etc., we are able to make comparative reports for the benefit of the superintendent, to judge whether or not the various departments are being operated on a sound economical basis. It may take some little time on particular cases where the duplicate orders are not frequent, and we have no chance for comparison, until repeat order goes through, and we can tabulate results. It might not be possible for us to call the superintendent's attention to these at once. However, after we have had these reports for a certain length of time and are able to give them careful study, then we will notify the superintendent of conditions as we find them from records as submitted and let him take the next steps.

Conclusion

I have endeavored to cite instances whereby the superintendent would be directly benefited if he would carefully investigate those particular items that are called to his attention by the cost accountant in his analysis of the various cost reports emanating from a practical cost system. By correct reports I mean that the superintendent must insist on accurate mill reports from his subordinates to cost department. You men are using material that has value, and if you please, must be treated as dollars and cents. Haphazard methods for reporting of time and material must be discontinued, and more accurate reports submitted. It is utterly a waste of time and money to work cost based on inaccurate cost data from the mill. Manufacturing data for cost are the foundation of a good cost system. Inaccurate reports we term "quicksand foundations," and you can well imagine their "wobbly" superstructure.

As in the case of the old-fashioned journal in the country store, which today is referred to as the book of original entry, likewise we term manufacturing reports the original entries for cost. To burden a superintendent with cost that is made up of 50 to 75 per cent overhead that he has absolutely no control over is entirely wrong, in my opinion. Items of overhead must be included in manufacturing cost eventually, but costs that I believe the superintendent will find more valuable from a manufacturing standpoint include only items of "direct cost" as materials used in furnish, direct labor as per payroll classification, materials used in conversion supplies, and items of expense such as electric lighting, handling ashes, auto trucking, etc.

The cost man can, without any added expense to the company, supply to the superintendent such information in the form of monthly or periodical cost in comparative form with added statistics, so as to bring the figures to a basis that the superintendent will always remember as "Lbs. of coal per cwt. of paper—cost per 100 lbs. of steam"—"felts and wires—cost per cwt. of paper"—"lubricating oils—cost per cwt. of paper"—"percent of labor to total conversion cost of operating plant"—"percent of reduction in labor as compared with percent of inoperation of plant"—and many other items.

FINALLY, MR. SUPERINTENDENT, We of the cost department depend on you to:

1—Supply us promptly with accurate mill reports.

2—Investigate reports from the cost department.

3—Ask for changes and explanations if necessary until you get a useful report to fit your needs.

4—Consider the cost man's duties from a practical viewpoint, as production without figures leads eventually to financial ruin.

5—Show the same percent of added interest during the next decade as you have shown during the past, and your company's batting average will be well over 300.

6—Accept the uniform cost finding system as applicable to

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presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

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MILWAUKEE WISCONSIN

IN any industry it is an advantage to know how much horsepower your pumps are using or what capacity is being delivered. With Allis-Chalmers tested pumps you can have this information which will permit of the most economical use of the efficiency of these modern pumps.

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SPEED REDUCING TRANSMISSION
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A typical installation of a James Speed Reducing Transmission, direct connected to motor.

Send for literature describing our transmissions and their adaption in the paper industry.

MEMBER OF AGMA

D. O. JAMES MANUFACTURING COMPANY
1114 W. Monroe St. *Manufacturers of Cut Gears of Every Description* **CHICAGO, ILL.**

your plant and just waiting to give you the information you desire.

7—Think of the cost man not as a red tape artist and trouble maker, but as a vital part of your organization, always rendering such assistance to the company as does the safety device to those who pass within the danger zone.

The ultimate result of the successful operation of a cost system will be donated in increased remuneration to each of you individually, and the company you represent will measure its reward in a better financial condition in dollars and cents.

International Paper Co. Entering Utility Field

Construction work on the first of a number of hydro-electric plants to be built and operated by the International Paper Company is well under way and announcement of a decision to develop additional sites is expected soon. The general plans of the company are such that several paper mills owned by the company in the United States will be eliminated, more paper mills will be operated in Canada in the future and the company will devote a portion of its energies to the production of power for public sale, an official of the company said yesterday.

The first of the power plants is expected to be in operation early next year. It is being built at Sherman Island, near the source of the Hudson, and will have an initial capacity of 20,000 horse power. The company is now operating three small hydro-electric plants in the Black River near Watertown, N. Y. These plants are converted paper mills.

The International is now operating one paper mill in Canada at Three Rivers, Quebec. At Grand Falls, N. B., the company owns a substantial interest in potential water powers estimated between 35,000 and 40,000 horse power.

Suggestions Considered by the Joint Committee on Papermaking Felts

If the sizes of felts could be standardized to inches in width and even feet in length the manufacturing costs of the felts would be considerably reduced.

In the felt finishing room standard sizes would mean a standard method of finishing, consequently the finished product would be much more uniform than at the present time. If the paper mills would accept the standard sizes the felts would always be uniform and would give much better results than those specially made up to meet their particular conditions. At the present time some customers ask for felts lightly napped, some medium napped and others heavily napped. If felts were standardized, there would be only one nap.

Standard sizes and designs of felts would mean a great saving in time and labor which, with the present method, is lost in changing to the various sizes and designs of felts. The slight difference in the work that the special felts produce would be more than offset by the advantages gained, such as the decrease in price, more prompt deliveries, the possibility of carrying standard sizes in stock.

There would be less chance for errors in the manufacture of felts, and the manufacturers would be able to concentrate on these standard sizes and designs and work out efficient improvements.

After careful study it has become perfectly plain that a better felt could be made at a lower cost provided there could be eliminated most of the small variations both in size and design, and such elimination would not make any material difference to the users, or at least the difference would be more than offset by the advantages. The advantages that would accrue to the user would be as follows:

First, difference in price: From a study of the cost figures it would be quite safe to anticipate a difference of 10 percent between those felts which were standardized as to style and design and the others, with a very strong probability of considerably larger reductions to follow.

The *second*, and perhaps even more important aspect to the user, is the delivery question. With proper standardization prompt delivery would be possible with no injustice to anyone. Under the present system the only way the customer can get prompt delivery is to order the felts made up and held. In the past this has proved difficult both for seller and customer because of the general uncertainty of the transaction, but if the standardization could be worked out, enough customers would be using any standard felt to warrant a felt manufacturer carrying a reasonable stock and making quick delivery.

The *third* factor is workmanship. Many of the operations in the manufacture of felts are guided by individual judgment. This judgment can be exercised to better advantage when the same size and design of felt is run through in

UNION SCREEN PLATE CO.
Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada

[redacted]

UNION BRONZE SCREEN PLATES
(Best phosphorized Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

The Witham Screen Plate Fastener, Patented
THE ORIGINAL THE BEST

SCREEN PLATES *and* DANDY ROLLS

Watermarking a Specialty

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WM. A. HARDY & SONS
FITCHBURG, MASS.
Originators and Oldest Manufacturers
OF THE
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ALSO SPECIALIZE IN
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MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control
(PATENTED)
WARREN IMPROVED PATENT DOUBLE DRUM WINDERS
Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties
SEND FOR OUR BULLETIN

THE HYTOR VACUUM PUMP FOR FLAT BOX SERVICE

Vacuum Produced Absolutely Without Pulsation

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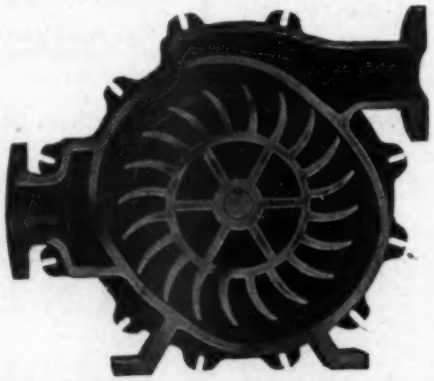
Saves Wires



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No Rods, Pistons, Crank Shafts, Loose Moving Parts, and No Gears

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New England Representative
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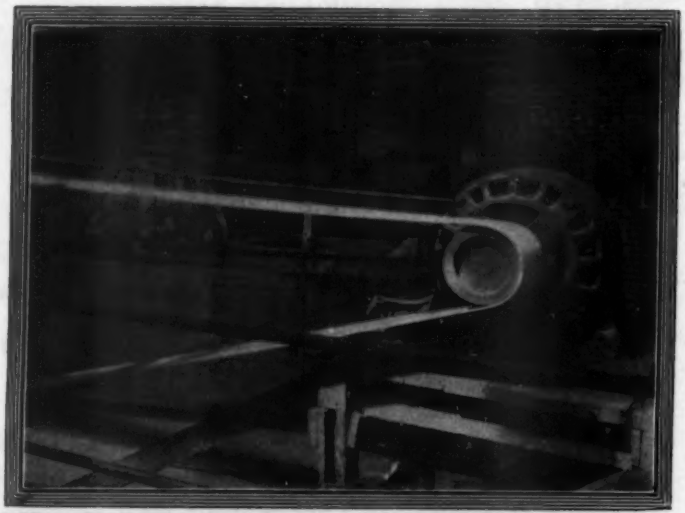
Fairbanks-Morse Electric Motors



Over 1300 H. P. in This Paper Mill

This 50 H.P. Fairbanks-Morse motor drives a beater in an eastern paper mill. It is one of over 1300 H.P. operating various mill machinery and delivering steady, satisfactory service in this mill. Standard 40-degree rating insures cool running and provides a factor of safety where the load is not definitely known.

Solid rotor winding with end rings cast on solid copper bars, gives strength and high conductivity. Solid cast frame with rigid base having broad feet cast on adds to the sturdiness of these motors.

Fairbanks, Morse & Co.
MANUFACTURERS CHICAGO

Oil Engines - Pumps - Electric Motors and Generators - Fairbanks Scales - Railway Appliances - Farm Power Machinery

quantity one after another, than when each felt is different from the last. Many of the operations depend entirely on the eye and judgment of the workman and very considerable improvement would result from such standardization.

All of these factors would work out to the benefit of those customers who are in a position to use standardized sizes and designs and they would not continue to pay for the higher priced work on the individual orders.

By having fewer sizes and designs to make the felt manufacturer would probably be able to concentrate on these and work out efficiencies and improvements more quickly than at present when each mill, and even each machine, takes an individual clothing.

The consolidation of size and design would enable many large paper manufacturers to cut their stocks of felts by the increased interchangeability between machines.

The extent to which such standardization could be carried out would have to be determined by joint action between the felt makers and the paper makers, taking into consultation the builders of paper making machinery for future machines.

As a purely tentative suggestion the following, as to size, is offered:

Length

Variations of only two feet in length in even figures from 24 to 50 feet, then 54 and 56, and from there on, in four foot lengths.

Width

Inasmuch as we are dealing with a very large piece of woolen fabric (the same piece of which, when measured under different conditions, will vary several inches in width) it seems unwise to make modifications for variations of one inch in width because the cost of making these variations is very considerable and the resulting variation is somewhat indefinite. It is suggested, therefore, that variations in width be confined to four inch jumps, or if this is too great, then to two inch jumps.

Design

This question would have to be worked out by the individual felt maker largely for himself but the same general principles should govern all. We suggest, for instance, that two standard designs of bottom board felts, one for board where fineness of finish is necessary and another one where the greatest strength, openness and long life are the prime requisites, and felt marks are not a detriment, would answer the majority of purposes.

In corrugated, sheathing, roofing, groundwood pulp and some others, a single design should be sufficient.

In all this standardization of both design and size, the felt maker would be free to make any deviations from the standard, but at a price commensurate with the increased cost.

This would enable any paper mill to get any kind of felt it wanted, as heretofore, but would put the cost where it belonged.

Inasmuch as each variation of either width or length, according to whether the felt is made joined or endless, necessitates a separate warp, it is evident that this is not economical manufacturing and must ultimately be paid for by the consumer of felts.

House Organ Editors in The Paper Industry

At the request of A. Ellis Frampton, Editor of The Hammermill Bond and Chairman of the 1922 National Safety Council Editors' Program, an appeal is made to the editors of Paper Mill Employees' Publications to support the Editors' Program in connection with the National Safety Congress at Detroit the last week of August. For the first time in four years the Plant Editors did not have a meeting with the National Safey Congress in 1921. This was due to very unfavorable business conditions, but the skies are somewhat rosier this year and Industrial Editors are called upon to face a field beset with problems in connection with changed business conditions.

The Editors will conduct two meetings, one a round table luncheon on "Safety Through The Plant Magazine," the other, a session on Publication Problems of particular interest to editors. These will be held either August 29, or August 30—the exact date to be announced later.

All Paper Industry editors are urged to attend if possible, as the discussions are stimulative, and the editor is sure to return to his work more efficient and with many new, usable ideas.

The employees' magazines of the paper industry have come through the period of depression better than those in many other industries, and with a return of prosperity their editors will have opportunity to continue their important work along the lines which may have been partially interrupted by the unfavorable business conditions of the past two years.

WHITAR
TRADE MARK REG. U.S. PAT. OFF.
News Blue
Auramine

We Supply a Complete Line of

Aniline *and* Pigment Colors

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SPECIAL SHADES OF COLORED PAPER OR SAMPLES OF DYESTUFF MATCHED AND COMPLETE FORMULAS FURNISHED

The White Tar Aniline Corporation
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For all grades of stock

PROMPT LABORATORY SERVICE

SANDOZ CHEMICAL WORKS
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238-240 Water St., New York

OUR SOURCE OF SUPPLY IS
SANDOZ CHEMICAL WORKS
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The BLACK-CLAWSON Co.

HAMILTON, OHIO

Builders*—Paper and Pulp Mill Machinery—*for

INCREASED PRODUCTION **SERVICE ALWAYS**

Holyoke Machine Co. HOLYOKE MASS.

MAKERS OF

Improved Machinery for Wood Pulp, Paper Mills, Paper Converters, Printers and Lithographers

LARGEST MAKERS OF

CALENDERS

FOR FINISHING ALL KINDS OF PAPER *and* CARDBOARD

We Build Our Machinery to Meet YOUR Requirements

Cotton and Paper Rolls

with Patented Fastenings

Miami Valley

Dayton, June 1.

Superintendents' Meeting

One of the most interesting meetings in the history of the Miami Valley Division of the American Pulp and Paper Mill Superintendents' Association was held Saturday night, May 13, in the Y. M. C. A. at Hamilton, Ohio. Preceding the program there was a dinner.

The speaker for the occasion was C. W. Plessinger, superintendent of the public schools at West Carrollton. His address was on vocational training as applied to the paper mills and other industries.

The speaker was obtained by a committee, with H. W. Server of the Miami Paper company at West Carrollton as chairman. The superintendents are anxious to have vocational training placed in the mills in the valley and they are endeavoring to do everything in their power to arouse the attention of the managers.

It was Mr. Plessinger's idea that the vocational training should be given the rank and file of those in the mills as well as foremen, superintendents and those higher up, as some day foremen and superintendents must necessarily be recruited from the rank and file. Mr. Plessinger thinks that the state and Federal government should stand a part of the expense of the vocational schools as many industries would be unable to finance such an undertaking.

The speaker said that in his opinion vocational education trains and fits the student for productive capacity and in addition leads to the production of a distinctively high quality.

Plans were made for the next meeting of the Superintendents' Association. It will be held the third Saturday in June, at Middletown, Ohio. The members with their friends will be guests of the Shartle Brothers Machine company. There will be the annual election of officers at this time. The nominating committee, appointed by A. W. Rolfe, is L. T. Murphy of the Auglaize Box Board company, St. Mary's; H. W. Server, Miami Paper company, at West Carrollton, and Jack Smith of the Gardner Paper Board company, at Middletown.

The members also have received an invitation from the Orr Overall company, at Piqua, to be guests of the company some time in July. The Miami delegation will make the trip in automobiles. They will be accompanied by their wives and families. It will be an all-day outing.

Aged Mill Man Dies

Friends in this vicinity were shocked to learn of the death of J. C. Newbrant, at West Carrollton, Ohio, Friday, May 5. He was 73 years old and was employed by the Miami Paper Mills.

Mr. Newbrant, who died suddenly from apoplexy, instituted the first Odd Fellows Lodge in West Carrollton and was one of the oldest employees at the paper mill. He was identified with the firm 35 years ago when it was known as the Friend company. Since that time he has worked continuously, more recently in the stock room. The deceased made his home with Mr. Dunifer, his son-in-law, and who is assistant general manager of the Miami Paper company.

The funeral was conducted from the Dunifer home. Mr. and Mrs. Dunifer were in Los Angeles when they received the telegram announcing Mr. Newbrant's death, but they arrived home in time to make arrangements for the funeral.

New England

Boston, June 1.

The first five months of 1922 have seen a remarkable improvement in some branches of the New England paper industry notably among the producers of fine papers, who have greatly increased the output of their mills. Unfortunately the wrapping paper mills and the board mills have not shared in this general improvement or have felt it to a lesser degree. Judging by the difficulty that New England distributors have in getting shipments from their mills which are located practically speaking right at their doors one would think the business in wrappings, kraft and manila was exceedingly good. But there is no question that the New England kraft mills could take a lot more business. The notable feature of the month in this branch of the business was the reduction in the price of kraft paper by Brown & Company, the country's largest producer, and maker of the famous Nibroc grade. Their new price, 7c, coincides with that of the other New England mills. With the price cut, the same company announced quite an important revision in their selling terms

Diamond Valv-in Head Soot Blowers Save Fuel Labor and Steam in the Big Central Stations

As a group the most critical buyers of power plant equipment are the big central stations. They have every facility for measuring the exact performance of the machines in which they are interested, and their Results Engineers are keen, intelligent judges, quick to discriminate between real and fancied efficiency and economy. One of the real tests, therefore, of any improvement in design and construction of a given type of power plant equipment is the attitude taken toward it by central station executives. If there is any uncertainty it is not taken up—if it possesses real merit they are glad to approve it.

We do not know of any piece of power plant equipment which has ever received from central station executives in the same length of time the cordial welcome and hearty endorsement which has been accorded Diamond Valv-in-Head Soot Blowers.

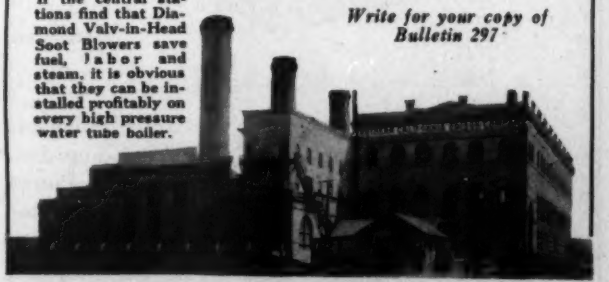
Over 2,000 units of this new type of soot blower have been purchased by over 125 central stations within the past eight months. Such representative operating companies as Commonwealth Edison, Detroit Edison, and Pennsylvania Power and Light, have ordered from 126 to 176 units.

You know these Central Station Users of Diamond Valv-in-Head Soot Blowers

Central Illinois Public Service Company
Duquesne Light Company
Erie County Electric Company
Indianapolis Light & Heat Company
Illinois Traction System
Northern States Power Company
Southern California Edison Company
St. Paul Gas Light Company
United Illuminating Company

If the central stations find that Diamond Valv-in-Head Soot Blowers save fuel, labor and steam, it is obvious that they can be installed profitably on every high pressure water tube boiler.

Write for your copy of Bulletin 297



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Diamond

VALV-IN-HEAD SOOT BLOWERS

Attention Manufacturers of News Print Paper!

MILLSPAUGH SUCTION ROLLS were proven on News years ago. The Laurentide Paper Company have now run successfully at 1031 feet per minute. On one machine making width of two rolls they produced 87½ tons in 23 hours. It was all good paper.

Suction Couch and Press Rolls increase production, improve quality, save wire and felts, eliminate top couch and save steam.

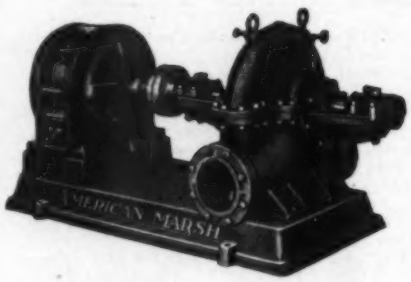
One of our customers made 2640 tons of newspaper over one Fourdrinier wire. These records do not surprise us, as new ones are being made every day.

Send for our catalog or request a call from one of our field engineers who will help solve your problems without obligation on your part.

THE SANDUSKY FOUNDRY & MACHINE COMPANY
SANDUSKY, OHIO

American-Marsh Paper Mill Pumps

Centrifugal and Direct Acting

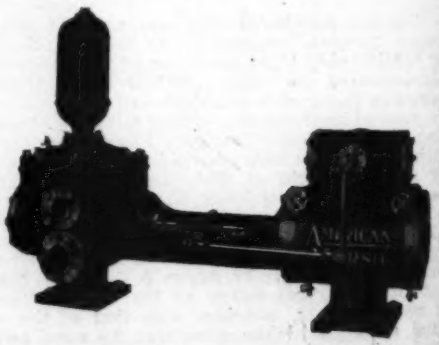


ESPECIALLY adapted for paper mill service where absolute reliability and high efficiency are required. There is an American-Marsh pump for every paper mill requirement, from draining the rolls on the dryers to handling heavy paper pulp stock.

Because of the fact that the factory is located in the heart of the largest paper mill district in the world, we have always made a specialty of paper mill pumps and our designs are the result of careful first hand study of the actual requirements.

The line includes

Boiler Feed Pumps	Jet Condensers
Centrifugal Pumps	Air Compressors
Stock Pumps	Vacuum Pumps
Deep Well Engines	Power Pumps



May we send you our general catalog?

American Steam Pump Company
Battle Creek, Michigan

which in the future we understand are to be 2% 30 days instead of 3% discount as previously.

Among the fine paper mills while there has been no important reduction in their prices, there has been a decided improvement in their orders as above stated. We believe there can be no doubt that the extensive advertising which some of the fine paper mills have carried on through National publications has aided the sale of their paper during this critical period of business reconstruction.

Paper Mill Supplies

It has been a month of ups and downs in paper raw material circles, but on the whole the tendency has been more upwards than down. In coal a very decided and not unexpected rise from 6.25 for West Virginia coal alongside wharves Boston to $8. This happened in the space of three weeks during May. And despite warnings of such an advance many paper mills bought coal at the advanced prices though there was no obvious reason for any consumer failing to cover his requirements before the strike became effective or some few weeks thereafter.

In waste papers the market showed its greatest advances on soft white shavings, heavy book stock and folded news. In very short order a buying movement brought the market on soft shavings to $3.50 at which price it is quoted today f. o. b. shipping point. Heavy book stock was stiffened by the buying activities of Fitchburg mills whose various purchases brought the price to an extreme of $1.85 f. o. b. Boston, or $2 delivered mill as contrasted with the prices that other mills are paying of $1.75 to 85 delivered. Folded news sold as high as $15 delivered mill, but to one mill only at that figure. Their quotation unsettled the market considerably and a price of $13.50 to $14.25 was not unusual and some mills are paying it at present. Mixed papers are being bought at $10.50 to $11 delivered, and kraft papers are quotable at $1.60 f. o. b. New England shipping point.

In cotton rags we have had the first evidence of a real buying movement this past month. The caution however which all consumers are exercising prevented any marked advances. No. 1 white shirt cuttings sold at 9½c to 9¾c delivered the mill. Twos and blues brought 2c delivered, No. 1 old whites repacked 6c, fancy shirt cuttings 4¾c delivered, with a few sales at 4¼c to 4½c. Roofings rags are also very quiet. Despite the building boom of the entire country the roofing mills have not been forced to operate very extensively in the raw material markets. At present they quote (New England) 90c delivered for No. 2 rags and 85c to $1 for first.

Rope has advanced also. At this writing we have heard reliable reports to the effect that foreign rope will soon be quoted at 6c to 6¼c ex docks, and as the domestic market is pretty well cleaned of large lots, the establishing of the 6c level would be no surprise. At present 5½c is the figure involved in outstanding contracts, with some business of course having been placed in lower grades at ½c less. In New England the delivered price of mixed strings is $1.10. No. 1 scrap bagging is being bought at $1 and much is available, with demand narrow.

A flood of wood pulp has been steadily arriving on Scandinavian vessels from Sweden and Norway; some of course comes from Canada's western coast via the Panama Canal to Boston and Portland. The foreign bleached sulphites are quoted at 4c on the docks, and some very good stock is offered at that figure. New England mills continue to quote 4½c at this writing.

Construction of the Great Northern Paper Company's logging railroad, extending from Seboomook Lake to St. John's Pond has been resumed with the departure of winter conditions in the northern Maine country. It is expected that the road will be completed this year. The main line of the road which is standard gauge will be eighteen miles in length when completed, and of this seven miles of track were laid last year and ten miles of roadbed completed. Branch lines will be constructed from time to time as they are needed. The building of this road marks a new departure in logging methods in the Moosehead Lake section of northern Maine and in fact it is something unusual for the entire country even perhaps including Canada. It introduces the transport of logs from the deep woods to the river and Lake by railroad, in other words a road built exclusively by a paper company for the sole and express purpose of hauling out logs. Up to this time logging operations have always been carried on near enough to rivers so that the logs could be easily hauled by horses or logging tractors to the rivers for driving purposes. Yet now even the Great Northern Paper Company, owning, as it does, hundreds of thousands of

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MANUFACTURING COMPANY

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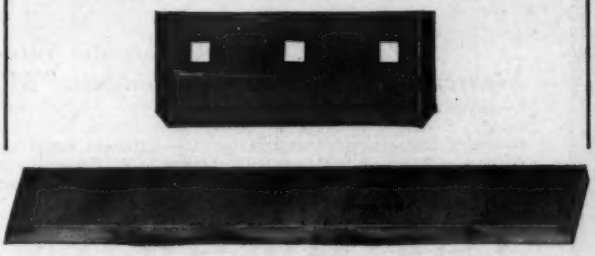

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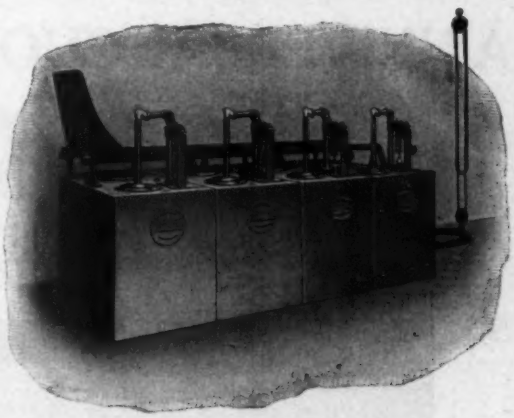

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LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER AND PULP MILLS—Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

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Steel fittings made for your individual requirements. Valves for pulp lines in stock at all times.

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acres in the north central section of Maine, in the heart of the State's great forest district, is forced to penetrate deeper into the woods for its spruce, using the railroad to haul logs located miles from streams, and the logs must first be hauled to the railroad by tractor. At the southern junction of this railroad on Seboomook Lake the Company is about to complete a six hundred foot trestle extending into the lake, built on twelve hardwood piers connected with hard pine girders on which the track is laid. From here the logs will be taken for transportation on south to the mills.

The Salesmen's Association of the Paper Industry which includes all direct mill representatives, having recommended the starting of occasional get-togethers to its divisional branches, a system of monthly luncheons was inaugurated on Wednesday, May 24th, when the New England Division members gathered at the Boston City club for a very informal affair which it is hoped will continue. During the luncheon John E. A. Hussey, vice-president of the Association for New England, and New England sales agent of the International Paper Company, read the following telegram from Dr. Hugh P. Baker: "Donald Maclaurin, Vice-president of our Association, and his local committee members generally join me in hearty greetings and good wishes for the first luncheon of the New England Salesmen today. May this luncheon be beginning of a series for bringing together New England salesmen for better fellowship and better understanding in this big industry of ours of which we are all so proud."

The New England salesmen are planning a most enjoyable outing on June 9th. They will leave Boston early in the morning and go to the Scituate Country Club by auto, over the famous Jerusalem road along the south shore. Tom Lawson's famous estate, Dreamwold, in all the glory of its rambler roses, will be seen. Luncheon will be at the country club, while during the afternoon golf will be in order. In the late afternoon the autos will move on to Plymouth for dinner there and return to Boston will be over a road bathed in a full moon for which the committee has purposely chosen this date. Many mill sales managers have planned to make this trip.

A new design of tank type tractor is being tried out by the Great Northern Paper Company, the machine being the product of the Lombard Traction Engine Company of Waterville, Maine. It is built to meet conditions where other tractors will be handicapped by excessive roughness of ground, etc. The Great Northern Paper Company operates a fleet of tractors in the woods of northern Maine and is of course constantly striving to improve on the machines it uses. The Great Northern has reached a stage in its logging operations where it can no longer cut spruce, and float it from a nearby stream down to the mills. It now must go miles into the woods away from rivers, and the distance to the logging waters must be covered with tractors. The new machine of the Waterville Company is known as the "A. O. L." type and has given some very good demonstrations. The design varies considerably from those machines in use. The engine is a duplex, four cylinders on each side, with two crank shafts in one case. There are two clutches and two transmissions, and the wheels are driven independently of each other, with the steering accomplished by the engine. One of these tractors has been delivered to the Great Northern Paper Company's shops at Greenville Junction and is being equipped there with a set of summer tracks. It will then be given a thorough trial which if satisfactory will mean that the new machines will entirely displace those now in use in the course of time.

The Northeastern Division of the American Paper and Pulp Mill Superintendents' Association held meetings at Waterville, Maine, on May 25, at which the following officers were elected: Chairman, B. N. Petrie of the Eastern Manufacturing Company; First Vice-Chairman, Fred P. Sall, of the Eastern Manufacturing Company; Second Vice-Chairman, Eugene Sullivan, Orono Pulp and Paper Company; Third Vice-Chairman, A. B. Larcher of the Penobscot Chemical Fibre Company; Secretary-Treasurer, B. T. Larrabee of the S. D. Warren Co. Three new members of the Association were elected including, George W. Verrow of the Eastern Mfg. Co., W. D. Summerville of the Eastern Mfg. Co., and J. S. Shumaker of the Parker Young Co. The meetings included visits to the Keyes Fibres Company at Fairfield, Me., the Keyes Pulp Mill, and the Waterville Iron Works makers of paper mill machinery. The banquet in Waterville was followed by an able address on the bleaching of pulp and problems connected therewith by Robert Wolf, an expert on paper mill technical problems.

Underside of Pyrobar Roof Deck and type of Pyrobar Tile which afford greatest protection against sweating

They Do Away With Roof Drip

Pyrobar Roof Tile will give your mill sure protection against roof condensation and its attendant evils. Pyrobar are cast from a dense, specially prepared gypsum, and stubbornly resist the loss or conduction of heat. A one-inch thickness of Pyrobar has the same heat insulating value as ten inches of concrete.

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Pyrobar save on construction costs, too. Their light weight means a big economy in supporting steel. They are easily and quickly erected. They are fireproof and permanent. If desired, our construction department will contract to erect Pyrobar. Send for estimates and descriptive bulletin.

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Oakfield, N. Y., Plasterco, Va., Cleveland, Ohio, Gypsum, Ohio, Genoa, Ohio, Detroit, Mich., Alabaster, Mich., Grand Rapids, Mich., Milwaukee, Wis., Fort Dodge, Iowa, Blue Rapids, Kas., Southard, Okla., Eldorado, Okla., Piedmont, S. D., Loveland, Colo., Denver, Colo., Arden, Nev., Amboy, Calif.

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The new Portland and New York Steamship Company, whose efforts to inaugurate a service between Portland and New York relying on the Maine paper mills' New York shipments to make the effort a success, have been described in The Paper Industry's New England report previously. This month we are glad to report that the first sailings were made, the Company having secured an excellent freighter, the "El Mar." The first sailing was on May 22 from New York to Portland, then followed two complete round trips that week, with a generous cargo of paper. The attraction and great importance of the new line is in its 10% differential under the all rail rate between the two cities. The cargo is landed in a favorable spot in Manhattan, at Pier 27, East River. Carl Crosby, of Bath, Maine, is president of the new line and Captain Frank Dooley, of Bath, is in charge of the company's Portland head office at present.

In order to protect themselves from possible exhaustion of pulpwood holdings in Maine and to care for a steadily increasing business, Hollingsworth & Whitney have purchased large tracts of timberland in Nova Scotia and New Brunswick at a cost of nearly $2,000,000. According to President Waldo E. Pratt of Boston new financing to cover the purchase will not be necessary, as the company has long been preparing for such a purchase. Officials of the company do not contemplate the erection of a pulp mill as the new lands will probably be held as a reserve for some time. However it is understood that there were three old mills included with the timberland transfer. The timber area in New Bruswick transferred amounts to 50,000 acres in addition to the transfer of lumber licenses on 83 square miles of crown lands. The former owners were C. T. White & Son of Sussex, New Brunswick.

The affairs of the two paper mills at Augusta, Maine, which have been in a constant state of flux appear to be straightening out under the efficient administration of a committee of creditors of the bankrupt company's. It is reported in Augusta, Maine, that three men, Messrs. E. H. Frye, F. D. True and a Mr. Harrington have been appointed to take charge of the affairs of the bankrupt company. The concerns were adjudicated bankrupt last January with total liabilities of $1,500,000. About 300 claims have been presented, aggregating $750,000. The depreciated and replacement value of the properties has been placed at $1,054,000 and the appraised value at $759,000. It is understood that since a committee of creditors has been operating the companies they have returned a small profit.

Log driving has been in progress on the Kennebec River in Maine this past month and about 60,000,000 feet of timber will have been driven down from the upper reaches of the river in Northern Somerset County. While the river appears to be unusually full of timber this year due to the concentration of the drives, there is a much smaller quantity, probably 4,000,000 feet less, than last year coming down stream. The cuttings of the Hollingsworth Whitney Company in this particular area have been about 5,500,000 feet. The Pine Tree Pulp Company, a new concern operating a pulp mill at South Gardiner, Maine, has made cuttings amounting to over 700,000 feet. The Cushnoc Paper Company, of Augusta, who have been undergoing severe financial difficulties, made no cuttings this year.

The George M. Graves Company, has moved its offices from Federal street, Boston, to large and commodious quarters at 77 Summer street to accommodate his growing trade in paper mill supplies. Mr. Graves started in this business a year ago last spring, after his return from a European trip in which he established valuable connections abroad, including the house of John N. Leighton of Liverpool. Mr. Graves was for many years purchasing agent of the Bird & Sons mills and was at one time secretary of the Roofing Felt Manufacturers Association. In his present business he buys a considerable part of the paper stocks used by the Bird Mills.

Preparations are being made by the Maine Central Railroad at Portland to receive a huge cordage of pulpwood from the Maritime provinces of Canada throughout the summer months. It is estimated that probably some 75,000 cords will come down during the next few months. The Oxford Paper Company and the International Paper Company are two of the largest receivers of this Provincial timber. The first shipment came in within a fortnight on the Philip T. Dodge, a steamboat in the International's service. The Oxford has two Norwegian steamers under charter to bring about

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Include Many Products Used by Pulp and Paper Mills

Digesters	Elevated Tanks
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Such must be the layer of pulp as it passes over the Fourdrinier Wire.

Snowflakes may drift, but the fibres of pulp must be spread evenly and uniformly over every inch of the Fourdrinier Wire if a uniform thickness and quality of paper is to be obtained.

Should the Fourdrinier Wire become slack at the edges, the pulp cannot be spread evenly —the finished paper will not be of uniform quality—the wire will wear out prematurely—and valuable time and production is lost in unnecessarily frequent shutdowns.

"Quality" paper can only be produced by the use of "quality" Fourdrinier Wires.

Tyler Fourdrinier Wires are woven in any width up to and including 250 inches.

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The W. S. TYLER COMPANY *Cleveland, Ohio*

18,000 cords of wood from Cape Breton, starting early in June.

Boston financial interests have been strongly recommending their clients to purchase securities and bonds of the International Paper Company which is very largely owned in New England already, or at least a very large section of the stock is owned here. Clarence W. Barron's Boston News Bureau calls International Paper Company "5s" an "impregnable" bond. The bonds are secured they say by a first lien on 200,000 horse power, undeveloped, partly developed, and fully developed aside from the wonderful paper production of the company.

A project which is expected to attract paper mills to Lubec, Maine, is a power development which will take advantage of the very great rise and fall in the tides at that point. A portion of the adjacent waters to the town will be connected by a canal 270 feet long and 100 feet wide with locks and dams. The incoming and outgoing tides would thereby maintain a ceaseless flow and engineers admit that the project is feasible and that a very great amount of power could be developed, and sold cheaply.

If plans now under consideration at the Great Northern Paper Co.'s Madison, Me., mill materialize, a large crew of men will be kept busy there on improvements throughout the remainder of the summer and into the fall. The major part of the work contemplated includes the deepening and widening of the river channel, and the installation of a tube for conveying logs from above the head gates into the mill without human aid. A new and considerably longer bridge across the canal will be part of the improvement the total cost of which will mean an outlay of close to $1,000,000.

Thomas F. Judge, of Biddeford, Maine, was buried in that city where his body had been brought from Grand Falls, Newfoundland, where he died this past month. Mr. Judge was the representative of Lord Northcliffe of England, in charge of his great paper mills in Newfoundland. He was instrumental in the introduction of various labor saving devices in paper mills and had planned and built several mills. He was a native of Biddeford.

A paper mill at Great Barrington, Mass., to be known as the Berkshire Coated Paper Company is financially backed to some extent by an official of the Hampden Paper Company who will become sales manager of the new concern. The company has an initial capital of $75,000. An old mill in the town has been renovated for the manufacture of glazed paper the machinery for which arrived during the past month.

New England paper mills have been much put out by the proposed duty of 4c per pound on casein and their protests were voiced in the Senate through David I. Walsh, junior senator from Massachusetts, who in his arguments pointed out that the prices of domestic and foreign casein were practically the same.

The Fort Griswold Paper Company of Montville, Connecticut, who it is understood are to operate a board mill, have been incorporated with $50,000 capitalization. The incorporators are Arthur Perkins, J. P. Harbison and Edna Millard, all of Hartford, Conn.

The Oxford Paper Company has adopted the practice of supplementing its distributors' stocks with stocks of paper at the mill, ready for immediate delivery, a comparatively new practice for them.

The Poland Paper Company at Mechanics Falls, Maine, is one of the companies who have been taking in quite a quantity of Norwegian woodpulp this spring.

Freight Reductions Made on Shipments to Texas

Freight rate cuts, averaging about 33 cents a hundred pounds on various paper products in shipments from Atlantic seaboard points to Texas common points via Galveston, have become effective June 1.

The new rate on newsprint will be 82 cents a hundred pounds, 33 cents lower than the existing rate. This will also include wrapping paper. Writing paper will have a rate of 88½ cents a hundred pounds and toilet paper will be shipped for $1.04 a hundred.

A Coupling that is as Strong as the Shaft Itself

The Double Cone Compression Coupling, as we make it, is absolutely the strongest coupling of the compression type.

Correctly proportioned to transmit the full capacity of the shafts it connects.

Each shaft is firmly held by a separate cone, and the cones are wedged and keyed into a continuous double-tapered sleeve or cover, overcoming any slight variation in shaft sizes, thus insuring perfect alignment in all cases. Then, too, they are

Easily Applied or Removed

We also make a belt type, Flexible Coupling for directly connecting Motors or Engines to Shafts or machines, and, in fact, everything for the mechanical transmission of power by belts or ropes.

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RETURN TUBULAR LOCOMOTIVE BOILERS WATER TUBE SCOTCH MARINE

A LARGE STOCK OF HIGH-GRADE BOILERS OF PRACTICALLY ALL SIZES, TYPES AND MAKES, TAKEN OVER FROM DU PONT CHEMICAL COMPANY'S AND OTHER PLANTS WITH PRODUCTION RECORDS — RECONDITIONED, OFFERED SUBJECT TO ANY INSPECTION, AVAILABLE NOW!

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If your Paper Machines are not equipped with Press Rolls of BARRE GRANITE you are not getting the results that you should get, for it is a recognized fact that granite rolls are much superior to any others and Barre Granite the best of all. Let us tell you about them.

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PRESSURE PIPE THAT NEVER BURSTS.
Built in sizes 1 inch to 48 inches.

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Built of selected Canadian White Pine, Wyckoff Wood Pipe is wound with steel bands whose tensile strength is 58,000 to 65,000 lbs. per square inch. The experienced engineer selects a pipe of proven dependability. Wyckoff Wood Pipe, during the past 65 years, has built a reputation that stands the keenest competition. It has been, during this time, the choice of the largest pipe users in the world. We also manufacture a high grade underground steam pipe casing.

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James Andrew Outterson

James Andrew Outterson, of Carthage and New York, a pioneer and one of the most conspicuous figures in the paper industry of northern New York, died suddenly of pneumonia in his apartments in New York City, on Saturday, May 6th, at the age of 63 years. At the time of his death, he was president of the De Grasse Paper Co., the Carthage Sulphite Pulp and Paper Co., the High Falls Pulp and Paper Co., the Ogdensburg Paper Mills, the Quebec Saguenay Pulp Co., and the Carthage Machine Co. He was negotiating the purchase of the Champion Paper Co. plant with a view to consolidating it with his other mill at Carthage and Ogdensburg.

James A. Outterson was born in Binghamton, N. Y., October 18, 1858, the son of Colonel and Mrs. James T. Outterson. His father was a paper mill superintendent, and his grandfather, Andrew Outterson, was a paper maker in Scotland and Ireland before coming to the United States. His great-grandfather was also a paper maker. He started to work at the early age of ten years, and for fifteen years wandered from mill to mill gaining experience in the trade. He is said to have worked in fully fifty different mills in this period of time.

Mr. Outterson's first business venture was in the year 1884, when he rented a small mill at Fayetteville, which burned a few months later. He then went to Brownville and rented the Lord paper mill and manufactured wrapping paper out of straw, rags and old papers. This was a success and he later organized the Outterson Paper Mill at Brownville, which is now the Harmon Paper Co. plant. He boasted of being first to make paper entirely from wood.

Mr. Outterson was recognized as one of the most prominent paper manufacturers in the business, and one who did more to build up the northern New York section to its conspicuous position in the paper industry than any other person. He organized many paper companies, or was the moving spirit in their organization. Among them and beside the Outterson Paper Co., were the Dexter Sulphite Pulp and Paper Co., at Dexter, the Racquette River Paper Co., at Potsdam, the Newton Falls Paper Co., and four mills in Carthage. He has been identified with numerous other paper mill deals and at the time of his death was stockholder and officer in several.

Mr. Outterson was a Mason and belonged to several fraternal organizations. He was one of the first members of the Board of the Black River Regulating District, a director in the Carthage National Bank, and president of the Carthage Machine Co.

Surviving are his widow, one daughter, Mrs.. David Balmat, and two sisters, Mrs. Mable Monte, of New York, and Mrs. Carrie B. Bernier, of Canton.

Noah Bryant

Noah Bryant, one of the best-known figures in the paper industry, died on Thursday, May 4th, at the home of his daughter, Mrs. Frank H. Milham, in Kalamazoo, Mich. His age was 83 years.

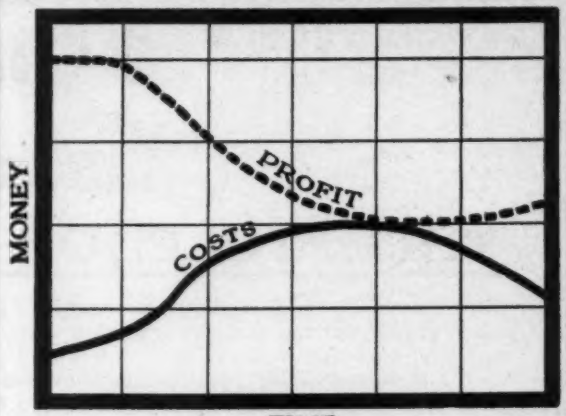
Mr. Bryant was born in England, and at an early age began to learn the trade of paper-making in one of the small hand-made paper mills near London. While still a young man, he came to America and became employed in a mill at Fitchburg, Mass., where he soon after became machine tender and left their employ to come west to accept the position of superintendent of the Kalamazoo Paper Co., then located where the Monarch division of the Allied Paper Mills now stands.

When George E. Bardeen resigned from an executive position in the Kalamazoo Paper Co., in 1883, to organize the Bardeen Paper Co., of Otsego, Mich., Mr. Bryant went with him as general superintendent. He remained until 1895, when he became one of the original incorporators of the Bryant Paper Co., and its first president. He held that position until succeeded by his son-in-law, Frank H. Milham.

Mr. Bryant was a conservatist in all his dealings. He originally held $10,000 in stock in the Bryant Paper Co., when its capitalization was $125,000, and these have now increased to a par value of over $400,000. He was also a heavy stockholder in the Illinois Envelope Co., and the Kalamazoo Vegetable Parchment Co.

Mr. Bryant is the last of a line of brothers and sisters. He is survived by one daughter, also a grand-daughter, Mrs. James Reynolds, of Kalamazoo.

Mr. William P. Perry, treasurer of the Esleeck Manufacturing Co., Turners Falls, Mass., died Saturday, April 29, 1922.



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"Lower costs are imperative if many mills are to continue to operate profitably."

It is, therefore, not surprising that Foxboro Recording Instruments are being installed in large numbers by progressive paper makers.

Foxboro Instruments produce clean, truthful records of digester pressures and temperatures, bleaching powder temperatures, beater and stuff chest liquid levels, dryer roll temperatures and speeds, and all other temperatures, pressures, humidity, liquid levels and speeds in mill or power plant.

Wherever they are used, increased efficiency and reduced cost of operation are made possible.

Write to Dept. B.B. for complete information and prices on any of our instruments.

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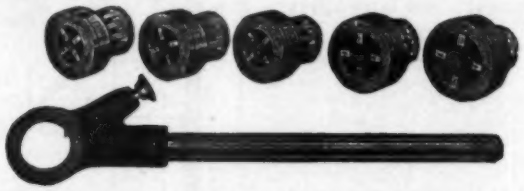

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little ratchet pipe threader in existence. It will reach the pipe that is tucked away in the corner, and cut the thread on it with ease. It threads ⅛" to ¾" pipe, and does its work quickly, smoothly and easily.

It measures 14" long, weighs complete with all die heads 9 lbs., or with one head ready for threading, just 3½ lbs. If the complete tool is not required, any combination of die heads can be ordered.

The change from one die head to another size, is easy and quick. A pull of the ratchet pawl knob, and one head drops out and the other drops in ready for use.

This is only one "Toledo" model. A card will bring you our complete catalog showing "Toledo" tools for cutting and threading pipe up to 12". Ask for it.

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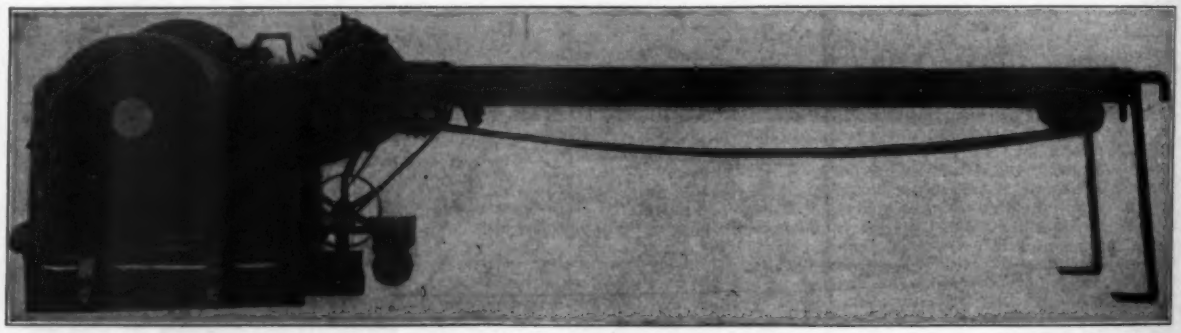

Capacity 2½ Tons Per Hour

Especially Adapted for Handling Waste Paper, Magazines, Etc., Before Feeding to the Beaters

Whatever You Cut, A GIANT Will Solve Your Problem

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Charles Ordway

Charles Ordway, M. E., inventor of many improvements in the present methods of evaporation and patentee of the Ordway-Yaryan Evaporator, died on April 29, 1922, at the age of 64.

Mr. Ordway was born February 8, 1858, in Massillon, Ohio. He graduated from the Wittenberg College, Springfield, Ohio, in 1877, and a few years later became associated with Homer T. Yaryan, inventor and designer of the Yaryan Evaporator. He afterwards became consulting engineer for the Yaryan Company, which concern he succeeded in 1916.

Having been connected with business for the last thirty years, Mr. Ordway was one of the best known evaporator men in the United States as well as foreign countries. The business will be continued by his sons, Harry A. and Carroll T. Ordway.

New Superintendent at Champion

Homer C. Ferguson, former manager of the bureau of standards and inspections at the Champion Coated Paper Co., Hamilton, O., has been made superintendent to fill the position made vacant by the retirement of William Schenck who has been superintendent for several years, after having worked his way up through the mills.

Mr. Ferguson has been with the Champion Coated Paper Co., for fifteen years starting in charge of the finishing room. He is one of the most popular men at the mills and his promotion will meet with the favor of the entire working force of that institution.

H. H. Jensenius, who for some time has been associated with Calvin L. Robinson as a pulp salesman, is now with the reorganized firm of Nilsen, Lyon & Company, pulp importers of 140 Nassau street, New York, and will represent the latter concern among paper mills. Mr. Jensenius has traveled all over the country selling pulp to paper manufacturers and is well known throughout the industry. In his new connection he will concentrate on eastern paper mills.

J. J. Patricof has resigned as president of the J. J. Patricof Company, Inc., and has severed his connection with the American Woodpulp Corporation, of 347 Madison avenue, New York, and has organized a new concern under the name of the Waste Materials Trading Corporation, with offices at 135 Broadway, New York, to deal in all grades of papermaking material. Mr. Patricof is president of the new firm, and William Wacht is secretary and treasurer.

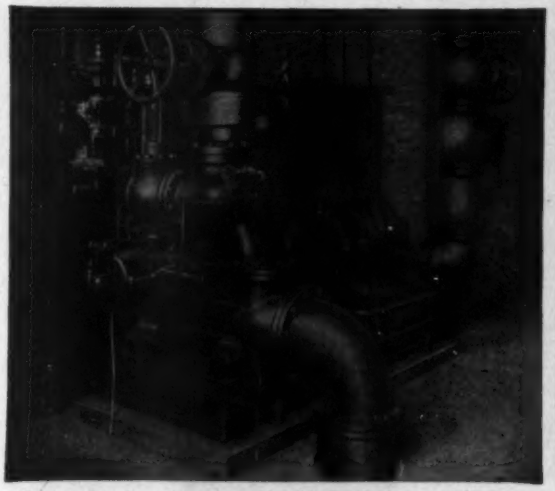
George F. Hewitt, chairman of the board of directors of C. B. Hewitt & Bros., paper, board and papermakers' supplies dealers of New York, died at his home in Montclair, N. J., on May 25. Mr. Hewitt was born in 1849 and was a nephew of the late Abram S. Hewitt, mayor of New York City in 1887 and 1888. His son, George F. Hewitt, Jr., is president of the C. B. Hewitt & Bros., which firm was established in 1868.

The Domestic Mills Paper Company, of 96 Reade street, New York, one of the largest paper jobbing concerns in the metropolitan district, has opened a branch office and warehouse at 413-419 West Erie street, Chicago, where a full stock of the various lines of paper the company handles will be kept. The branch is in charge of Cromwell Jones, who holds the title of western manager.

Allen Curtiss, for many years head of the manufacturing department of the International Paper Company, was elected a vice president of that company at a recent organization meeting of directors. Mr. Curtiss will continue to supervise the manufacturing department.

The New York sales office of the Albemarle Paper Manufacturing Company has been moved from 41 Park Row to 280 Broadway. Samuel C. Knode is in charge of the branch. The Albemarl company makes blotting papers and specialties with mill in Richmond, Va.

Gustav Wuerst, for the past two years with the Seaman Paper Company in the Chicago office, and formerly with the United Paperboard Company, has been appointed manager of the Seaman branch office in Cincinnati, O., succeeding B. E. McCauley, resigned.



De Laval turbine driven centrifugal boiler feed pump delivering 700 gal. per minute against 685 ft. head at 2400 R. P. M.

Centrifugal Boiler Feed Pumps

DE LAVAL turbine-driven centrifugal boiler feed pumps have many advantages:

They are simple and compact. They give reliable and uninterrupted service and require little attention. There is an entire absence of vibration and shocks in the pipe line, thus making relief valves unnecessary and rendering the pump suitable for use with automatic boiler feed regulators or with flow meters. There is an entire freedom from liability to overloading. Troublesome parts, such as valves, packings, sliding surfaces, air chambers, etc., are eliminated. There is little expense for attendance and upkeep. All parts are readily accessible. Cylinder lubricants are not required and little oil of any kind is used. The steam consumption is lower than that of direct connected pumps. The exhaust is entirely free of oil and can be used in open feed water heaters or in drying rolls.

The accompanying photograph shows a De Laval velocity stage turbine driven boiler feed pump designed to feed 14,000 H. P. of boilers under a maximum pressure of 300 lbs. per sq. in. The delivery pressure is controlled by an accurate pressure governor, in addition to which there is an overspeed emergency trip device operating an independent valve.

The turbine is of the latest De Laval design for high steam pressure and superheat. The valve chest is in the upper half of the casing, so that heat will not be conducted to the oil wells and bearings. Hand valves are provided for shutting off some of the nozzles, so that the highest efficiency can be maintained under changing conditions of steam pressure and load. The governor valves and operating levers are located above the center line of the turbine, where they are readily accessible for adjustment and inspection.

The pump is of the standard De Laval horizontally split casing design, all working parts being accessible upon lifting the casing cover, and removable after loosening the bearing caps. Four stages are used, as a moderate pressure per stage results in a longer life of impellers and wearing rings and higher efficiency.

All De Laval pumps are guaranteed as to capacity and efficiency and are fully tested before leaving our works.

DE LAVAL

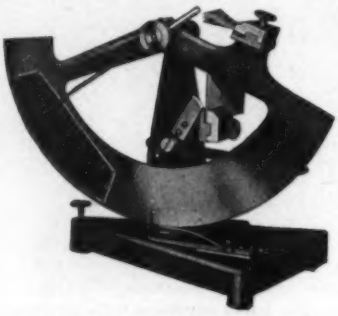
Steam Turbine Co., TRENTON, NEW JERSEY

Local Offices: Boston, New York, Philadelphia, Pittsburgh, Indianapolis, Chicago, Duluth, Kansas City, Denver, Salt Lake City, Charlotte, Atlanta, Birmingham, New Orleans, Dallas, Seattle, San Francisco, Los Angeles, Montreal, Toronto, Vancouver.

233

ELMENDORF PAPER TESTER

Determines Tearing Strength



The "personal equation" is eliminated and the tearing strength of your paper accurately measured by the use of this device, which gives quick and definite figures on which specifications can be based.

Write for Bulletin 17 on Paper Testing Instruments

Thwing Instrument Co.

3353 Lancaster Avenue Philadelphia, Pa.

73

BACK TO NORMALCY

Owing to substantial reductions in the cost of all materials entering into the construction of Jenssen Acid Towers, we are now building them at

NORMAL PRICES

Will YOU let us show YOU how to make MONEY by making a

BETTER ACID

Don't forget that every second sulphite mill on this continent is using our towers, so ask your neighbor what HE thinks of them.

G. D. JENSSEN CO.

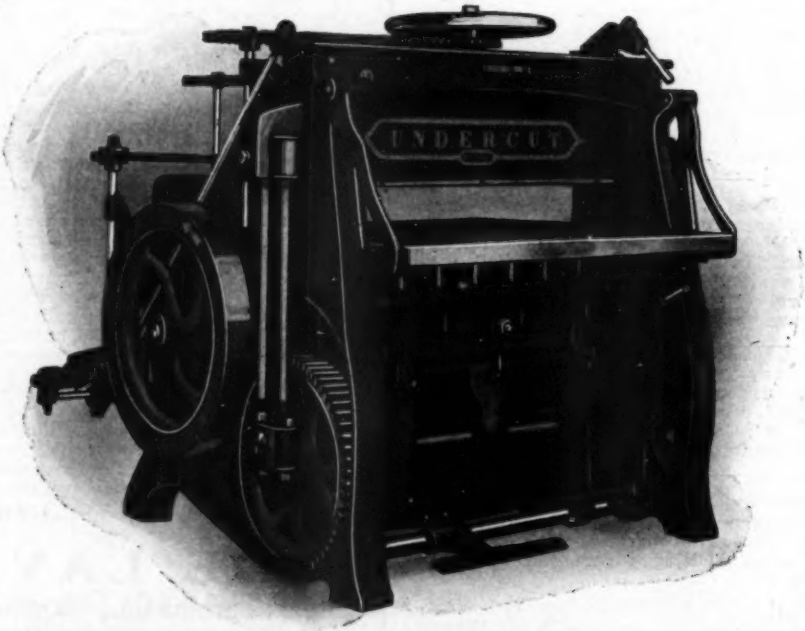
200 5TH AVE. NEW YORK, N. Y.

The Smith & Winchester Mfg. Co., South Windham, Conn.

Paper Making Machinery

Unexcelled in Simplicity of Design Workmanship Accuracy and Safety

May we send you our New Cutter Bulletin 500-22



Paper Bag Making Machinery

Automatic Clamp and Power Back Gauge Starting and Stopping Device Two-Hand Throw in Lever

OUR 48-INCH HEAVY CUTTER

Ream Cutter —— **THE UNDERCUT** —— Paper Mill Trimmer

New Paper Box Plant

Corporation papers have recently been issued to The American Paper Container Co., Toledo, O. The new company has an authorized capital stock of $300,000, all of which is subscribed by strong Toledo financial interests, who see in the processes which the company has acquired, a revolution in the paper box industry.

A three story brick plant has been purchased which provides about 40,000 square feet of floor space in its present condition.

The inventor of the processes used and of the machine necessary for the manufacture of the boxes, is Mr. J. R. Van Wormer, who has been made vice-president of the company. Mr. G. A. Vradenburg, vice-president and general manager of the Toledo Seed & Oil Co., resigned this position to become president of the new company and take active charge of its affairs.

The plant when it begins operations will have a capacity of about 200,000 boxes a day. This will be increased gradually. The machines are almost entirely automatic and will make possible a very low labor overhead.

The Toledo company will be simply the parent organization. It is the plan of the company to build plants in New York, Philadelphia and all of the large centers of the country to manufacture paper boxes under the new process.

New Paper Warehouse

The contract for the finest paper warehouse in Southwestern Michigan has been awarded by Birmingham & Prosser Co., to the Miller-Boyer Construction Co., Kalamazoo, Mich.

The building will be 54 by 166 feet in dimensions, basement and three stories high. It will be of reinforced construction, strictly fire proof, the frontage to be of tapestry brick and of a dignified design. The total floor space provided will be 34,560 square feet and the construction will provide for a load carrying capacity of 250 pounds per square foot, or 8,640,000 pounds for the whole building.

The main floor will be at car floor level and will be used entirely for warehouse purposes. The company's offices will be spacious and well laid out for efficient handling of that branch of the business. They will occupy the entire frontage on the second floor.

New Paper Mill at Nitro

A new paper-making company, headed by Charles G. Hartje, has purchased nine and one-quarter acres at Nitro, W. Va., the former government ordnance site, and will expend $400,000 on its new plant, according to announcement.

Charles Hartje is president of the concern; W. H. Kimberland, vice-president; and R. C. Stewart, secretary-treasurer.

The new firm will be known as the Charleston Paper Manufacturing Company. The factory probably will be completed some time in September. It is planned to start operations with a force of 100 men. The factory will manufacture various grades of wrapping paper.

New Mill in Louisiana

Announcement is made that the Southwestern Pulp & Paper Co., of Monroe, La., will open bids on June 1 for the construction of a $1,000,000 paper plant to be erected on the Missouri Pacific railway and Ouachita River, south of Monroe.

The proposed plant will have an area of 70,000 square feet. It will be built absolutely fire proof and will have a daily capacity of 100 tons of No. 1 refined Kraft pulp.

Bids for the structure, which will rank as the largest and most up-to-date in this part of the country, will be taken at the offices of Jos. G. Mayo, president and general manager.

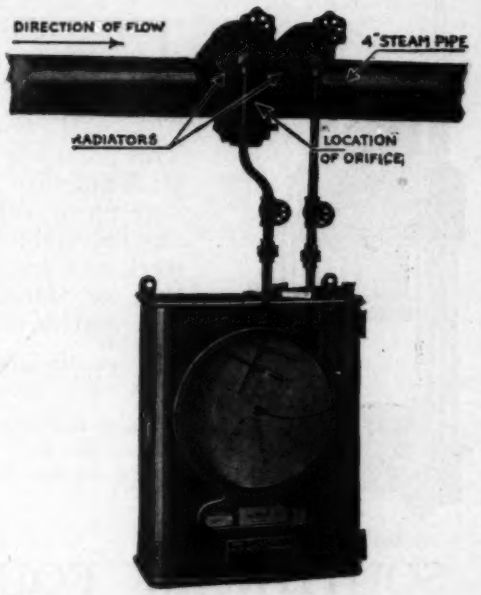
Market Prices for Machine Wires

The Armstrong Bureau of Related Industries for its clients, the manufacturers of machine wires, furnishes for publication the following prevailing market price information on brass Fourdrinier wires (new standard) at last quoted to the trade by the respective sellers and cleared through the Bureau:

	Price per sq. ft.
No. 60 mesh	50c- 51c
No. 65 mesh	52c- 53c
No. 70 mesh	56c- 57c
No. 75 mesh	59c- 62c
No. 80 mesh	61c- 72c

Mr. A. D. Halporn, who for some time has been associated with the sales staff of the Philadelphia office of the Combustion Engineering Corporation, has now become a member of their New York sales force.

Bailey Fluid Meter



PRACTICAL —— ACCURATE

This shows the Bailey Fluid Meter complete for the measurement of steam. It consists of the Monel metal orifice installed between a pair of flanges, radiators and valves tapped into the pipe on the inlet and outlet sides of the orifice and pipes connecting these to the recorder.

Bailey Fluid Meters are easily and cheaply installed as changes in piping are not required and the accuracy is guaranteed.

They are the most practical and satisfactory meters for recording and integrating the flow of steam to turbines, digesters, paper machines and other processes. Steam can be measured at any pressure and temperature, exhaust steam included.

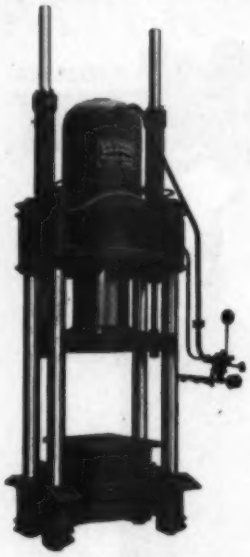
Either pressure or temperature recorders, or both, may be added to record on the same chart as the rate of flow.

Our engineering department is ready to suggest the proper equipment for your service.

The BAILEY METER COMPANY
2023 East 46th Street, CLEVELAND, OHIO

SOUTHWARK PULP PRESSES

For Long, Hard Service and Economical Operation



600-Ton Pulp Press

THE PRESS illustrated is typical of our improved designs, of all steel construction with the exception of the rams, which are chilled iron ground on the working surface and outside packed.

This press has pressing table 33″ wide by 46″ long, with ram stroke of 48″. It is designed for any standard working pressure up to 3500 lbs. Special sizes can be furnished to suit any requirements. These presses are equipped with Southwark two pressure three-way valves of forged body spindle type for controlling. Either the two pressure or single pressure system may be had.

The press is provided with bottom pressing table and improved drop track which does not require manual control.

We also build sulphite presses, baling presses, pumps and accumulators for the pulp trade and carry in stock a complete line of hydraulic valves, fittings and pipe.

It will pay you to have our quotations on your requirements.

SOUTHWARK FOUNDRY & MACHINE CO.

PHILADELPHIA PENNSYLVANIA

Branch Offices: Fisher Bldg., Chicago; Swetland Bldg., Cleveland

Plamondon Transmission Machinery

Products

Heavy Gearing and Friction Clutches for paper-mills, rubber-mills, tubemills, cement-mills, rolling-mills, stone quarries, and rock products, mining and coal-handling machinery, elevators and malt houses, turbines and water wheels, sugar refineries, packing houses, electric light plants, powder-mills, glass factories; cut gears and machine molded gears of all kinds.

Shafting, pulleys, hangers, couplings, collars, pillow blocks, worm-wheels, fly-wheels, and rope sheaves.

Makers of grey iron, and semisteel castings by analysis.

Special machinery built to order on modern tools at usual shop rates.

A. Plamondon Manufacturing Company

Engineers, Founders, and Machinists

Established 1859—Incorporated 1877

Works and Main Office:

5301 South Western Boulevard Chicago, Ill.

Emergency Orders Receive Special Attention

Many Improvements Being Made

Improvements aggregating between $50,000 and $60,000 will be made in the plant of the Oregon Pulp & Paper Company at Salem, Ore., within the next few months, according to C. F. Beyerl, general manager of the company, recently.

Contracts have already been let and plans drawn for the installation of six completely new horizontal water filters which will take care of 5,000,000 gallons of water every 24 hours, but which will be so constructed that this amount can be doubled when required.

The installation of these filters will cost over $50,000 and will be completed by August. They will occupy a floor space of 50 by 60 feet on the south side of the mill.

Eighth National Exposition of Chemical Industries

The Eighth National Exposition of Chemical Industries will be held this year in the Grand Central Palace, New York City, during the week of September 11th to 16th inclusive.

It will follow immediately upon the fall meeting of the American Chemical Society.

The exposition will contain a specially interesting section for the pulp and paper mill trade dealing with shipping containers, including the container itself whether of metal, wood, fiber, paper, glass, or in cooperage products of slack and tight barrels, tanks and towers, and with machinery for packaging, labeling, handling and conveying the packaged material and marking it ready for final shipment.

Fred Enders & Company, Inc., wood pulp dealers and importers of 52 Vanderbilt avenue, New York, is being dissolved, and the business of the firm will in the future be under the direction of Bulkley, Dunton & Company, of 75 Duane street, New York. Fred Enders, president of the former concern, is now in charge of the pulp department of Bulkley, Dunton & Company, and takes with him to his new connection the representation of a number of Swedish pulp mills for whom he acted as selling agent in the United States while conducting his own firm. Bulkley, Dunton & Company have imported wood pulp for a good many years and are well known to paper manufacturers in this country. With their new sources of supply obtained through the acquisition of Mr. Enders, and with a man of Mr. Enders' capabilities at the head of their pulp department, they should occupy a very important position in the wood pulp trade.

"Alfelco Facts" is the name of the new house organ, published by the Albany Felt Co., Albany, N. Y. The first number is a very interesting little booklet, comprising sixteen pages. In their page of Greeting, they shake hands with the paper-makers and express the thought that paper-makers and felt-makers ought to be better acquainted with each other. The first article is Part One of the subject, The Art of Felt Making. It is well written and nicely illustrated. This is followed by information which a purchasing agent should give when buying felts, so that the order may be executed to its greatest advantage. "The Broke Box" is a column of miscellanies open to correspondents for the betterment of understanding between paper-makers and felt-makers.

The International Paper Company has leased the entire seventeenth and eighteenth floors in the new Pershing Square Building, which is to occupy the site of the old Grand Union Hotel on the east side of Park avenue from Forty-second to Forty-first streets, New York City, and will move its general and executive offices from 30 Broad street to the new location when the building is ready for occupancy. It is understood that an annual rental of about $100,000 will be paid by the company for its new office quarters. A lease for ten years has been taken on the floors. The I. P. offices have been at 30 Broad street since the company was organized in 1898.

Owing to the continued expansion of their business, M. Gottesman & Company, Inc., wood pulp importers, have found it necessary to engage larger office quarters, and are now occupying the entire seventeenth floor of the building at 18 East Forty-first street, New York, where they have been located for some years. The new offices were laid out in accordance with plans prepared by one of the foremost consulting engineers in this line.

Change of Address

The New York office of The Paper Industry, in charge of Mr. G. D. Wyatt, has moved to the new Dodge Building, 53 Park Place.

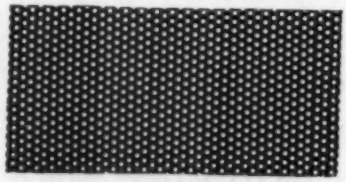
THE PRESENT DAY DEMAND IS FOR ROLLS THAT ARE
FIRMLY WOUND,
EVENLY WOUND,
COMPACTLY WOUND,
FREE FROM WRINKLES,
ACCURATE AS TO WIDTH,
ACCURATE AS TO DIAMETER,
AND WITH CLEAN-CUT EDGES.

EXPERIENCE OF OVER TWENTY YEARS IN DEVELOPING AND SPECIALIZING IN SLITTING AND ROLL-WINDING MACHINES HAS MADE US THOROUGHLY FAMILIAR WITH ALL PROBLEMS IN CONNECTION WITH PRODUCING SATISFACTORY ROLLS, AND THIS EXPERIENCE WE PLACE AT YOUR SERVICE TO HELP OVERCOME DIFFICULTIES WITH WHICH YOU MAY BE CONFRONTED.

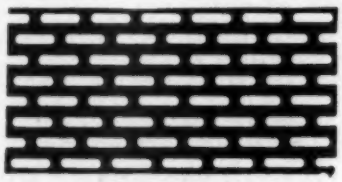
ADVISE US OF YOUR NEEDS, GIVE US PERMISSION TO PLACE A CAMERON SLITTER AND ROLL-WINDER IN YOUR PLANT FOR A THIRTY DAYS' TRIAL—AND WE WILL DO THE REST.

CAMERON MACHINE CO.
61 POPLAR STREET
BROOKLYN, N. Y.

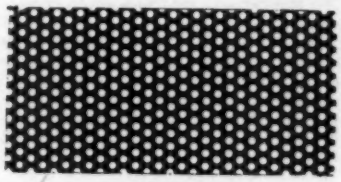
Perforated Metal Screens for Pulp and Paper Mills



.065 inch round



⅛ x ¼" Slots



3/32 inch round

Steel, Copper, Brass, Bronze and other alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.

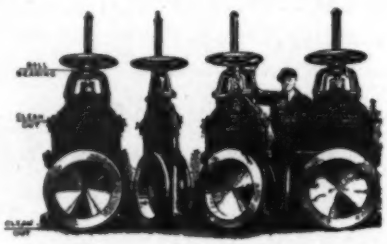
CHARLES MUNDT & SONS 57-65 Fairmount Avenue, Jersey City, N. J.

RECORD

(PATENTED)

QUICK OPENING GATE VALVES

Lever, Screw or Rack Operated



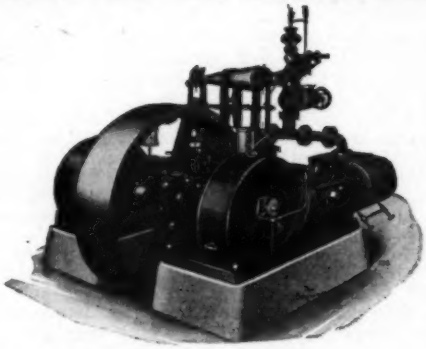
Furnished of Bronze, Acid Resisting Metals or Cast Iron

MANUFACTURED BY

RECORD FOUNDRY & MACHINE CO.

LIVERMORE FALLS, MAINE

BROWNELL



Your production depends on your engine. Economically you can have only the best. And the safety of your expensive paper machine demands careful selection of the engine drive.

Brownell Variable Speed Engines were the first in the field. Their consistent, reliable operation is a by-word in many plants. A patented safety device protects your plant.

THE BROWNELL COMPANY

Dayton, Ohio, U. S. A.

Established 1855

VARIABLE SPEED **ENGINES**

WE-FU-GO AND SCAIFE

WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

Big Paper Plant for Los Angeles Harbor Assured

That a paper mill valued at $10,000,000 will be established in the harbor district was announced recently by Fred L. Baker, president, and Earl M. Leaf, vice-president of the Los Angeles Shipbulding and Drydock Company. The plant of the shipbuilding company will be taken over by a newly organized syndicate and the manufacture of paper from Canadian wood pulp will be started within a short time. British Columbia will be the origin of the wood pulp and the product will be shipped in the raw state to Los Angeles harbor plant. Other branches will be established later on the Pacific coast.

Both officials have been in London for the past four months negotiating with English capitalists in regard to the establishment of the industry on the Pacific coast. Included in the negotiations are many thousands of acres of timber land now the property of an English syndicate. The employment of many thousands of men will result from the operation of the mills.

Three Rivers P. & P. Reorganized

Announcement has been made by the Three Rivers Pulp & Paper Co., Ltd., that it is being reorganized and will be hereafter known as the St. Lawrence Pulp & Paper Co., Ltd. Shareholders in the old company receive a like amount of stock in the new company. Capitalization of the new company will consist of $1,000,000, 8% cumulative participating preferred shares and 40,000 common shares of no par value. It is intended subsequently to make an issue of $3,000,000 first mortgage bonds, secured upon the company's properties, and the proceeds of these bonds will be utilized to defray the cost of the construction of a newsprint paper mill and for other corporate purposes. No public offerings of the bonds, however, will be made at the present time.

The sales office of the Valley Iron Works Company, of Appleton, Wis., in New York City which has been located at 334 Fifth avenue has been moved to the new Borden Building at 350 Madison avenue, where larger quarters are occupied. Harry Bennett, formerly associated with George F. Hardy, has joined the sales organization as sales engineer and will co-operate with W. H. Burns, sales manager of the company, in the eastern territory.

Announcement is made that the New Westminster Paper Company has been incorporated with a capital of $250,000. It is the company's intention to erect a $100,000 plant on the Fraser River, British Columbia, within the limits of New Westminster. The promoters are from Wisconsin and they will specialize in tissue paper.

The Superheaters Co., 17 E. 42nd St., New York City, manufacturers of Elesco steam superheaters, have revised and published their engineering Bulletin T1, wherein is explained in detail the latest features of the Elesco superheater, which are considered as representing an important advance in superheater engineering.

Combined Locks Paper Co., whose main office is at Appleton, Wis., has made a lease of the property of Pride Pulp and Paper Co., Tomahawk, Wis., for 90 days, during which time they are negotiating with the present owners for the purchase of the property.

Fitchburg Duck Mills

ESTABLISHED 1844

FITCHBURG, MASS.

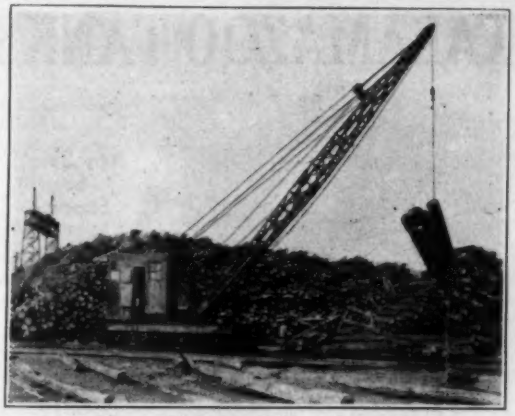
MANUFACTURERS OF

STANDARD AND MULTIPLE

DRYER FELTS

English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width

Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIBUNE Three Ply Felts for Coarse Papers.



Reduce Material Handling Costs

When the cost of common labor began to rise the American Splint Corporation decided to install a Type E "Industrial" Crane to handle and pile logs into tiers 45 feet high. Three men and the Crane now do this work which formerly required twelve.

Daily cost is $19.17 with the Crane, against $75.60 for the twelve men, under low wages. The saving is $56.43 a day, or $16,629.00 for 300 working days.

"This convincing proof of the savings made prompted us to order a second, or duplicate Crane, which we found as convenient and economical as the first," says Paul N. Hayes, Vice-President and General Manager of the American Splint Corporation.

A look into your own methods would perhaps reveal conditions which an "Industrial" could remedy in the same way.

Write for our illustrated catalogue No. 109

INDUSTRIAL WORKS, Bay City, Mich.

Rebuilt Paper Mill Machinery in Stock and Guaranteed

Not Where Is and As Is

FOURDRINIER TISSUE MACHINE—One 96", one 68".
FOURDRINIER PARTS—Pusey & Jones 118", 100". Kutter Trowbridge 96".
PRESS PARTS FOR PAPER MACHINES—Pusey & Jones bell crank housing two sets 18"x96", Black & Clawson swing arm housings with rolls.
DRYERS—Four 48"x111", thirteen 36"x95", four 48"x68", one 84"x67", eleven 42"x66".
MARSHALL DRIVES—Two Black & Clawson self-contained stand with friction clutch cone pulley and 6" mortise gears. Mortise gears and pinions for Pusey & Jones Marshall drives 5" to 8" face.
CHILLED CALENDERS—One 66" face, five roll, one 54" face, five roll.
DILLON DOCTORS—For Machine Calenders 60" to 120" face.
SLITTERS AND WINDERS—One 120" Warren, one 108", 36" Kidders.
REELS—Pusey & Jones two drum upright 48" to 114".
BEATERS—Five 72"x42" Noble & Wood, one 66"x42" Noble & Wood, equipped with three cylinder washers; one Dilts 62"x50" iron tub, one Jones 62"x52", seven Horne 36"x36". Two No. 2 Claflins, two No. 1 Claflins.
JORDANS—One Wagg Majestic, three No. 2 Dillon Improved, one large Horne, four Monarch, one Jones Standard, two Pope Brushing engines.
SCREENS—Six 10 plate open side Packer, two 6 plate, one Moore & White auxiliary.
STUFF PUMPS—Deane triplex 9"x8", Gould triplex 8"x10", Sandusky triplex 4"x6".
REVOLVING SHEET CUTTERS—One 104" Horne, five 61" Hamblet, four 61" Finlay, one 50" Hamblet diagonal, one 42" Finlay.
WET MACHINES—Four 72" Bagley & Sewall Hydraulic.
SUPER CALENDERS—One 45", one 42", one 36" Holyoke.

We have a large number of pumps and over five hundred calender, press and couch rolls in stock.

Frank H. Davis Company

175 Richdale Avenue, Cambridge, 40, Mass.

KALAMAZOO TANKS

Any Size or Shape

Blow Pits
Acid Storage Tanks
Vats, Etc.

We are especially well equipped to handle large tanks, having a good many years' experience in paper mill requirements.

Ask for catalog. Send us size required and specifications. We will make blue prints for same if desired.

KALAMAZOO TANK & SILO CO.
KALAMAZOO, MICHIGAN

STACKS BREECHINGS TANKS

Our erecting facilities are such as to make it possible for us to replace or repair smoke stacks in any part of the United States.

LITTLEFORD Steel Smoke Stacks and Flues are ENGINEERED to suit the individual requirements of every purchaser. The design and methods employed in their erection are the results of over thirty years' experience.

Our engineering ability and experience is at your disposal for the asking.

LITTLEFORD BROS.
500 E. Pearl St., Cincinnati, O.

A Breath of Rain-Washed Air

Did You Ever

open the window after a summer shower and fill your lungs with deep inhalations of pure, invigorating rain-washed air?

This FREE BOOK

explains how to equip your building so you will be assured an unfailing supply of air equal in purity to the after shower breezes, and of a practically uniform temperature the year round.

Write for your copy today

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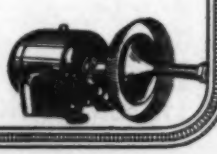

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Will Outlast Steel Tanks

Wood tanks, made from good material, will last from thirty to fifty years. They are not corrodable, and need never be painted on the inside, which enables them to give continuous service.

Our Slogan—"Satisfied Customers Only"

Write today for information that should be in your possession. This is a part of our Co-operative Service.

Pittsburgh Office
606 BAKEWELL BLDG.
Houston (Texas) Office
320 BEATTY BLDG.

New York, May 1, 1922.

CONSISTENT and healthy improvement continues to be manifest in the paper industry. From various sources come reports of increasing activity, of demand for practically all kinds of paper broadening, of manufacturers finding it necessary to expand their mill operations, of jobbers procuring a better volume of business than in a long time, and of consumers experiencing a pick-up in their branches of trade as to bring them more frequently into the market for paper and for larger quantities. Certainly, it would seem that the paper industry is rapidly getting back to a normal status. Mills are running at a larger rate of capacity than at any time since the memorable business boom back in 1920, and the production of paper of nearly all kinds is at present in excess of what was considered normal before the war; moreover, there are numerous signs that consumption has not yet reached its height and that demand still has some lengths to go before attaining its maximum in the present increased business movement. This means, of course, that paper manufacturers have even better market conditions to look forward to than now prevail.

Statistically the paper industry is unquestionably in a strong position. Recent figures compiled by the Federal Trade Commission from reports rendered by paper mills all over the country show conclusively that marked improvement has occurred during the past several months. Paper production reached a new high level for more than a year and a half in March, when a total of 593,860 net tons of all kinds of paper and paper board was manufactured by United States mills. The importance of these figures can be seen when it is understood that something like 51,000 tons more paper was produced in March than in any single month since the paper manufacturing activity started on the downgrade following the never-to-be-forgotten period of abnormal business shortly after the world war. March production of paper was no less than 92,000 tons in excess of that in February, and, illustrative of the remarkable increase in manufacturing operations over the dull months of last year, was 223,000 tons greater than in July, 1921, when production was at the lowest point for last year.

April production was only slightly below that in March, a total of 528,461 net tons of all kinds of paper being produced in the former month by domestic mills, which is some 24,000 tons in excess of the average monthly output based on the Commission's reports covering the past five years of 504,175 net tons. An encouraging feature of the commission's reports for the past several months is that mill stocks of most kinds of paper have been reduced, which indicates that in spite of the sharp upturn in production, paper manufacturers have disposed of their output readily and at the same time moving a part of their surplus stocks.

This highly gratifying expansion of productive operations in the paper industry is of course a reflection of improved business conditions generally. Consumption of paper is steadily mounting as a result of greater activity in the printing, publishing, retail, paper box and various other trades where paper is used. One only has to inquire among these trades to learn that much better conditions are being experienced, that the movement of all varieties of merchandise is on the rise and that the public at large is at last buying the things which it needs and which for quite a lengthy period it held back in absorbing. People are finally regaining confidence in the prices of commodities and are buying to cover their wants, not only for the present but also for future use. Factories all over the country producing various manufactured articles are speeding up production, unemployment is on the decline, our export trade is increasing; in short, business is rapidly assuming something approaching a normal status. The paper industry, being an excellent barometer of business because it is dependent on so many other branches of trade for its orders, is reflecting this improvement to a very apparent degree, and gives promise of continuing on its way toward better times along with the other basic industries of the country.

There is, however, one phase of the paper industry at present which is far from favorable. That is the matter of price. There is little or no doubt that many paper manufacturers are today runing their plants at very close to top speed and are finding an outlet for their product without difficulty or delay and yet are realizing a very scant margin of profit. Some mills probably are operating at a loss. The complaints that are registered on this score by paper mill men the country over are of such character as to prove that in one sense the industry is not in as favorable a position as would be assumed from the statistics relating to production, shipments from mills, etc. Competition among manufacturers for business is extremely keen. Mills are leaving nothing undone in an effort to corral every single order that it is possible for them to get; few, if any, are letting the question of price stand in the way of them landing orders—all because the average paper manufacturer is bent on keeping his plant or plants operating on full schedule. The net result has been that prices on most kinds of paper have been repeatedly beaten down until market levels today are such that there is little or no profit in making paper. The prices obtaining on book papers and on paper box boards are apt illustrations; the same condition to a lesser degree exists in other kinds of paper. How long this situation can continue is problematical; most assuredly it cannot go on indefinitely, and it would appear that now that consumption of paper is getting back to a point where there is enough business to go around among all paper mills, some improvement in this price condition should ensue. It is, without question, a harder matter to advance prices than to lower them, and it seems that paper producers are hesitant to take the step toward bringing prices on their product up to a level where circumstances warrant. Paper manufacturers should realize, however, that marketing their product at prices which allow for no profit to themselves is unjustified, unhealthy and unethical, and that the sooner a move is made toward rectifying this condition, the better it will be for the industry as a whole.

Probably no other kind of paper is in quite as active demand as news print. Publishers are absorbing print paper in large tonnage and in steady fashion and are keeping news print mills busy filling their requirements. Advertising in the daily newspapers is increasing, which makes for a larger consumption of news print, while newspaper circulation also is on the rise, particularly in those cities and towns where publishers have reduced the price of their papers. News print prices are firm at a basis to contract buyers of 3.50 cents per pound f. o. b. mills on standard news in rolls, and there is quite some talk in the trade anent a possible advance during the next several months.

Book papers are gradually moving in better volume after having experienced a very slow market. Magazines and trade periodicals are adding pages to almost every issue, and are consequently taking more paper from mills, yet prices on book paper are in a most unsatisfactory position. Machine finished book is selling at around 6 cents per pound f. o. b. delivery points, while coated book paper is bringing only in the vicinity of 8.50 cents a pound. Tissues are in good demand and quotably steady, and coarse papers are moving well despite large importations of kraft wrapping from European sources. Fine papers are showing improvement day by day. Printers are buying in larger amounts, and business concerns are laying in fresh supplies of stationery. Prices on bonds and ledgers are firm and exhibit a tendency to advance.

There is aggregately a good movement of boards. Paper box manufacturers are buying freely, especially those making folding boxes and fibre shipping containers, but board prices are low—much lower than they should be in view of the present cost of raw materials and labor. Plain chip is selling at about $35 a ton f. o. b. delivery points, with some of the eastern mills delivering chip into New York at $32.50, while filled news board is bringing only between $35 and $40 a ton delivered.

Wood Pulp

We can supply any grade of Pulp that you need, whether for

Prompt delivery from docks
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Future shipment from abroad

We are sales agents in the United States for the following brands (among others):

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Uddeholm	Lion Brand
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50 East 42nd Street
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Quality: It means more than price

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PULP

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"Forshaga"
Bleached Sulphite
"Klarafors"
Easy Bleaching Sulphite
Strong Unbleached Sulphite
"Hurum"
"Bamble"
Extra Strong Kraft; Bleached and Bleachable Sulphate
"Edsvalla" 50% Moist
"Dejefors" Dry
White Spruce
Ground Wood

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Dealers in Domestic Chemical and Mechanical Pulps and Paper

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FOREIGN AND DOMESTIC
PAPER MAKERS' SUPPLIES
CHEMICAL AND MECHANICAL PULPS
COTTON, JUTE AND FLAX WASTES
EAST INDIA MERCHANDISE

ESTABLISHED 1895

Daniel M. Hicks
INCORPORATED

Foreign and Domestic **Rags, Bagging, Rope and Waste Paper, Pulps, Wires, Chemicals, etc.**

IMPORTERS —— *DEALERS*

200 Fifth Avenue, New York City

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FREDERICK BERTUCH, SPECIAL PARTNER
21 East 40th Street, New York City

Importers of Chemical Pulps
BLEACHED AND UNBLEACHED

Agents for Kellner Partington Paper Pulp Co., Ltd.
Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden;
Bergvik and Ala Nya Aktiebolag, Söderham, Sweden

Papermaking Rags

All kinds of raw material for paper mills are enjoying increased trade activity, and cotton rags are sharing in the improvement to their full extent. Demand from consuming quarters is still somewhat limited; that is, papermakers are buying chiefly to cover actual and direct requirements, nevertheless there is proportionately a larger demand than in some time and the market is exhibiting a firmer tone than probably at any time thus far this year. Certain grades of rags show a decided upward price tendency; in fact, at least slight advancement has been scored by prices in some cases, and it would appear that if the prevailing market condition continues values will undergo additional enhancement.

There seems little doubt that certain descriptions of papermaking rags are in rather light supply for this time of the year. Ordinarily the spring witnesses rag supplies at their greatest level for the entire year, this being due of course to the fact that during the spring housecleaning period more rags are made available than at any other time. Possibly the same situation as usually exists has obtained this spring, insofar as regards increased amounts of rags being available, but indications are that collections the country over have been slow so that the supplies moving into grading centers from various country sources have not begun to measure up to normal. Dealers claim that this is a reflection of the low prices that have ruled on rags during the past few months, arguing that so little has been obtainable for old rags from paper mills that collectors have not found it profitable to gather rags, with the result there has not been the incentive to push collections that there is when prices are higher. Moreover, signs are not wanting that in a good many instances dealers and packers are quietly storing rags in anticipation of better prices, and the removal of such supplies from the market obviously helps to emphasize what certainly appears to be a shortage of rags.

Thus far this season paper manufacturers have been occasioned no difficulty in getting all the rag stock which they needed, and the probabilities are they will not have any trouble in covering requirements unless the unexpected should happen where consumption of rags should increase very substantially above what it now is. But the danger of an actual scarcity makes for a firm price tone, which is gradually getting stronger as consumers expand their buying. Packers and dealers for the most part have no large accumulations of rags in stock and are therefore in a position to demand higher prices as they dispose of stock as it comes in and when they have to go out seeking further supplies. Moreover, there is a well defined opinion among rag dealers that consumption of papermaking rags is destined to reach a very high point during the current year, this belief being occasioned chiefly by the tremendous building operations throughout the country and expectations of a heavy consumption of building papers, which are made almost entirely of rag stock. Another bullish factor is that European rag merchants view the outlook in a bullish light and are flatly refusing to sell rags to American importers at less than certain price levels, so that the movement of rags from Europe into the United States in recent months has not come up to normal because importers have not been able to meet the prices demanded on the other side.

Roofing rags have firmed considerably under at least a little broader movement into consuming channels. Prices have advanced several dollars a ton, and, judging from the present market tendency, are likely to go higher. No one looks for any runaway rag market, but there are few if any dealers who do not expect roofing rags to touch around 1.25 cents a pound in the very near future; under which circumstances there is no great desire shown to contract with mills to supply sizeable tonnage of rags at about one cent per pound or slightly less, which is the present market basis on roofing stock.

New cuttings also are in a firmer price position. Fine paper mills have been more actively in the market as purchasers and have absorbed sufficient cuttings to put dealers and graders in a stronger position where they can insist on more favorable prices. No. 1 white shirt cuttings are quoted at about 10 cents a pound at dealers' shipping points, unbleached muslins at 9 cents, white lawns at 9 cents, light silesias at 6.25 cents, bleached canton flannels at 8.25 cents, and washables at 3.50 cents. Old whites are steady and are sought in fair volume. Blues continue quiet but quotations are well maintained.

Average quotations f. o. b. shipping points are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	10.00-10.25
White shirt cuttings, No. 2	5.00- 5.50
Fancy shirt cuttings	4.50-4.75
Washables, No. 1	3.75- 3.50
Unbleached muslins	8.75- 9.00
White lawns	8.75- 9.00
Overall cuttings, blue	4.75- 5.25
Black silesias	3.25- 3.50
Light flannelettes	7.75- 8.00
Canton flannels, bleached	8.00- 8.25
Canton flannels, unbleached	7.00- 7.25
Shoe cuttings, bleached	6.00- 6.25
Shoe cuttings, unbleached	5.25- 5.50
Light silesias	6.00- 6.25
Linens, No. 1 white, foreign	13.50-14.50
Light prints, foreign	5.00- 5.50
Old Stock—	
Whites, No. 1 repacked	4.75- 5.00
Whites, No. 2 repacked	3.00- 3.25
Whites, house soiled	1.50- 1.75
Whites, street soiled	1.25- 1.50
Lace curtains	3.25- 3.50
Thirds and blues, rough	1.20- 1.40
Thirds and blues, repacked	1.75- 2.00
Black stockings	2.00- 2.25
Cotton canvas, No. 1	3.50- 3.75
White cotton batting	2.00- 2.25
Roofing, No. 1	.95- 1.00
Roofing, No. 2	.85- .90
Dark colored cottons, foreign	1.00- 1.10
Blue linens, foreign	3.25- 3.75
Grey linens, foreign	5.00- 5.50
White lines, foreign	9.00- 9.50
Light prints, foreign	1.90- 2.00

Rope and Bagging

A sudden run of demand on old rope recently caused prices to shoot upward at a remarkably rapid rate, and old manila rope is now bringing figures which represent an advance of over a full cent per pound from the market levels obtaining less than a month ago. Sales of manila rope in No. 1 condition have been reported in frequent cases at 5.25 to 5.50 cents per pound at dealers' shipping points, and there has been talk of transactions up to 6 cents a pound, though sales at the latter level have not been actually confirmed. It seems that the descent of certain paper mills onto the market for old rope found dealers with comparatively little rope in stock, and it therefore did not require very much buying to send prices bounding upward. The market continues strong with consumers freely inquiring for rope and with dealers demanding stiff prices and showing seemingly hesitancy to enter commitments involving large amounts of material. As is well known, a good percentage of the old rope consumed by American paper mills is imported from Europe, and news of the sharp advance in prices here has sped across the Atlantic and dealers in England and other European countries have put their prices up on rope also until importers here claim they cannot buy on the other side at much below 6 cents a pound landed here.

Old bagging is quiet and such movement as there is into consuming channels is of strictly routine character. Prices exhibit little change, and the tendency appears to be downward notwithstanding the big rise in old rope and despite an appreciation of new burlap values of fully 100 per cent within the past several months.

F. o. b. shipping point quotations follow:

THE WATERBURY FELT CO.

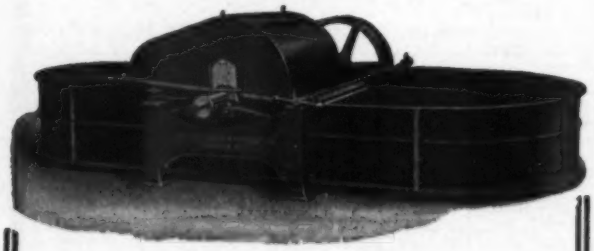
SKANEATELES FALLS

New York

FELTS and JACKETS

Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

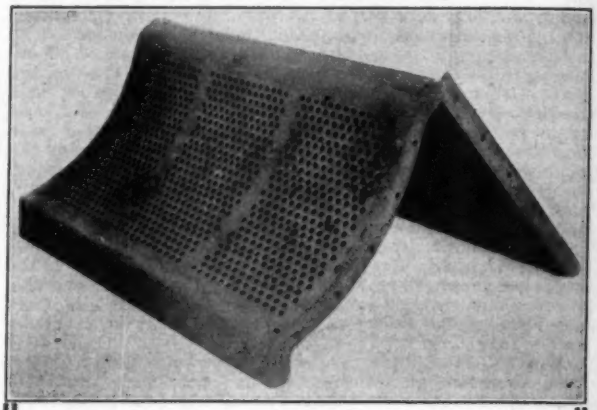
They Satisfy



"Dayton" Beating Engines are Built for Heavy Duty

Dayton Beater and Hoist Co.

DAYTON, OHIO



Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

The Shartle Continuous Beater Company

MIDDLETOWN, OHIO

STOWE & WOODWARD CO.

Newton Upper Falls, Mass.

Makers of Rubber Covered Rolls

Maximum Resiliency WITH Minimum Softness

Long Life

	New York and Chicago
Gunny, No. 1 domestic	1.00-1.15
Gunny, No. 1 foreign	.90-1.10
Scrap bagging, No. 1	.90-1.00
Roofing bagging	.65- .75
Wool tares, heavy	1.40-1.60
Wool tares, light	1.20-1.40
Manila rope, No. 1 foreign	5.25-5.50
Manila rope No. 1 domestic	5.25-5.50
Sisal strings	1.40-1.60
Mixed strings	.80- . 90

Old Papers

A fairly good demand for old paper of practically all kinds is reported and the market for this commodity is in a firm position. Despite the contention of paper and board manufacturers that in some instances they can purchase wood pulp at relatively cheaper prices than waste paper, and that it therefore pays them to use the primary material instead of the substitute stock, waste paper shows a strong advancing tendency and prices on most grades have advanced considerably during the past several weeks.

Dealers continue to lay great stress on the comparative shortage of certain kinds of old paper. Such grades as white shavings and flat stock are said to be in far lighter supply than in years, and the reason advanced for this is that print shops are not operating at normal capacity and that publishers of magazines and periodicals are more economical in printing overissues of their publications than they usually are; also that during the rather slow period of business in recent months the public has not bought as many magazines as it ordinarily does, thus making for a smaller ultimate supply of old books and magazines which is now being felt to its fullest extent.

There seems no doubt that a more or less shortage of some kinds of old paper actually does exist; probably it is not as severe as some trade factors endeavor to paint it, but if shavings and magazines were not scarce to at least some degree, it is hardly likely that prices would have gone to the levels that now prevail for these kinds of waste paper. No. 1 soft white shavings are selling at 3.50 cents a pound at dealers' shipping points and there is no large supply available even at this figure. The high level of prices on shavings can be best adjudged when it is understood that soda pulp can be bought freely by paper manufacturers at the cost of soft shavings—in some cases at even less. Old heavy No. 1 books and magazines have sold at 1.60 cents, with 1.50 cents about the lowest figure which dealers will consider. White news cuttings are readily bringing 1.70 cents and higher, old No. 1 kraft paper 1.75 cents, ledger stock 1.75 cents, and No. 1 hard white shavings 3.75 cents. Low grades of old paper show a strengthening tendency, with current quotations ranging between 60 and 65 cents a hundred pounds at dealers' shipping points on folded newspapers, 80 to 90 cents on overissue newspapers, 45 to 50 cents on No. 1 mixed paper, and 35 to 40 cents on common paper.

Prices f. o. b. shipping points are as follows:

	New York and Chicago
Hard white shavings, No. 1	3.75 -4.00
Hard white shavings, Nos. 2-3	3.00 -3.25
Soft white shavings	3.40 -3.60
Colored shavings	1.25 -1.50
Heavy book, No. 1	1.50 -1.60
Crumpled book, No. 1	1.15 -1.25
Ledger stock	1.70 -1.80
Kraft No. 1	1.70 -1.80
Manilas, No. 1	.90 -1.00
White blank news	1.70 -1.75
Overissue news, No. 1	80 - 90
Folded news	.60 - .65
Mill wrappers	.65 - .75
Box board cuttings	.55 - .65
Mixed paper, No. 1	.45 - .50
Common paper	.35 - .40

Chemical Pulp

The market for chemical wood pulp is fairly active. There is a rather unsettled price tone, due apparently to the anxiety of some sellers to market supplies, yet this condition seems to be gradually adjusting itself as demand from consuming quarters gradually undergoes expansion. There is no question but that present demand for pulp is of broader dimensions than in some time. Paper and board manufacturers, having need for larger amounts of pulp owing to increasing operations in their plants, are more actively in the market as buyers than in many months, and the probabilities are were it not for the fact that supplies are ample to take care of the

The
Hinde & Dauch Paper Co.

Corrugated
Fibre Shipping Boxes
and Packing Materials of
Acknowledged Superiority

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MAIN OFFICE
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EASTERN MANUFACTURING COMPANY

BLEACHED SULPHITE

Made from spruce grown in the forests of Northern Maine.

Send for Samples.

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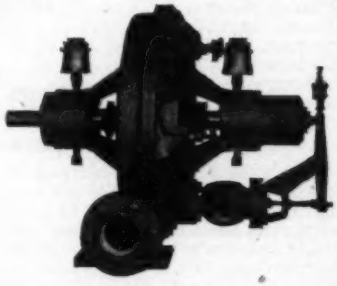
The satisfactory draft blower for mechanical stokers, and hand fired furnaces. Quiet, durable and efficient. 500 to 28,000 CFM—static pressure up to 8".

Carling BLOWERS

A steam turbine of simple construction, of great durability and high efficiency—½ to 60 horsepower

The CARLING blowers and turbines are standard equipment of the great steel mills of the middle west, and hundreds of other plants where high grade equipment is specified.



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Endurance—Resistance
Economy—Design

Four practical reasons for lining your boilers with

"STEEL MIXTURE"

It lasts from two to three times as long as ordinary fire brick.

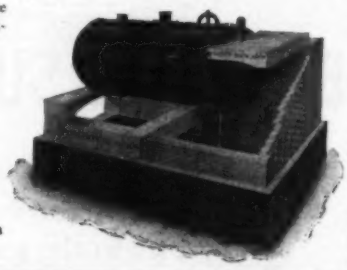
It resists heat up to 3500 degrees F.

Very economical to install and it saves money on repairs and replacements.

"STEEL MIXTURE" Blocks are large, tongued-and-grooved and when fitted together form a long-lived, smooth, clinkerproof surface.

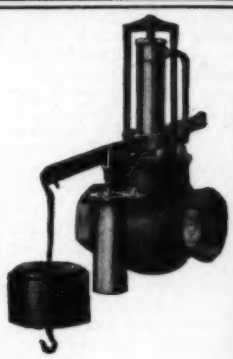
Made for all styles and sizes of boilers. Boiler Door Arches, Fire Box Blocks, Back Arches and Blow-Off Pipe Protectors, Furnace Arches, Fire Cement. Can be shipped promptly from stock.

Send for new catalogue and a "Book of Measurements."



McLeod & Henry Co.
Troy, N. Y.

New York Boston
Detroit



THE Davis Pressure Regulator shown opposite is only one of the Davis Valve Specialties. The line includes pressure regulators for steam, air, water or oil, steam traps, balanced valves, float valves and many other steam savers for paper mills.

All Davis equipment is simple—dependable—accurate. Almost a half century of truthworthy operation assures that. And it is being sold at a lowered price with a pre-war guarantee of satisfaction or money back covering the sale.

Write the G. M. Davis Regulator Co., 414 Milwaukee Avenue, Chicago, for descriptions of the valves listed opposite.

Water Control Valve
Non-Return Valve
Exhaust Relief Valve
Balanced Valve
Stop and Check Valve
Pump Governor
Pressure Regulator
Emergency Stop Valve
Flow Regulator
Fluid Level Controller
Float Valve
Water Relief Valve
Steam Trap

DAVIS VALVE
STEAM SAVERS SINCE 1875
SPECIALTIES

SWENSON EVAPORATOR CO.

Main Office
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Eastern Offices
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30 Church St., New York

Works
Angola, Indiana Harvey, Illinois
Bedford, Indiana Joliet, Illinois

Cable Address, "Evaporator Chicago," Western Union Code

SWENSON EVAPORATORS

requirements of consumers, prices would advance to an appreciable extent. Statistics prove, however, that tremendous amounts of wood pulp have been imported into the United States for some months past, even when demand from paper mills in this country did not begin to approximate that at present, while domestic production of pulp has been at a high level. While demand has improved to a very gratifying degree recently, sellers undoubtedly have good-sized stocks which they are gradually working down, and until at least the bulk of these holdings are liquidated there is little probability of any sharp advance in prices.

Quotations are in a steadier position than in some time but no rise in any grade of pulp has been noted. Instead, reports frequently drift in of a sale of some kind of pulp here or there at what could be called a concession in price, though it can be stated that indications point to most of the supply in weak hands having been removed and sales at below recognized market levels consequently are becoming fewer and fewer.

Bleached sulphite of domestic origin and of No. 1 quality is quoted at around 4.50 cents per pound at pulp mills, with No. 1 unbleached sulphite quoted at an average of 2.75 cents. Soda pulp is selling at 3.50 cents, and No. 1 domestic kraft at from 2.75 cents upward. Kraft apparently is in as firm a price position as any other kind of chemical pulp.

F. o. b. pulp mill quotations follow:

Bleached sulphite	4.50-4.75
Easy bleaching sulphite	3.00-3.25
Unbleached sulphite, No. 1	2.65-2.85
News grade sulphite	2.40-2.65
Soda pulp, bleached	3.50-3.75
Mitscherlich, unbleached	3.25-3.50
Kraft, No. 1	2.75-3.00
Screenings, refined	.80-1.00

Mechanical Pulp

For a time recently mechanical wood pulp exhibited an easy market tendency and sales were frequently reported at price reductions. Indications were at that time that large available stocks of pulp were proving too much for the market to absorb, with the result the situation took on a top-heavy condition, and buyers had matters much their own way as regards prices when they wanted ground wood. The decided improvement that has lately taken place in the paper industry, however, has brought paper and board mills more actively into the market for ground wood, and prices have steadied under a larger movement of pulp into consuming channels. The tone is still far from firm, yet it has steadied to a very perceptible degree, and now that summer and hot weather is approaching, grinders are growing less desirous of moving surplus stocks of ground wood, preferring to hold pulp for later in the year when water conditions are not so favorable for grinding operations.

Prices at the moment are just about holding their own. Domestic producers quote in the vicinity of $31 to $32 per ton at grinding plants for prime spruce wood, freshly ground, for prompt shipment, with quotations ranging a dollar or two on either side of this level, depending on the distance of the grinding mill from the consuming centre. Canadian ground wood is reported available in some cases down to $26 and $27 a ton, but the extra freight involved is said to bring the cost of this pulp up to about the same level as domestic ground wood.

Chemicals

Demand for most kinds of papermaking chemicals has shown some improvement. There is a better general call from consumers, who indicate that they are increasing the scope of their buying operations because of larger requirements. Moreover a better contract movement is noted, with paper manufacturers evincing more willingness to consider future needs. Prices are steady to firm, at about the following ranges:

Alum, lump ammonia	3.50- 3.75
Alum, lump starch	4.00- 4.25
Blanc fixe, powdered	3.50- 3.75
Bleaching powder	1.75- 2.00
Brimstone (long ton, at mine)	14.00-16.00
Casein	9.50-10.50
Caustic soda, spot delivery	3.50- 3.75
China clay, domestic washed	8.00-10.00
China clay, foreign	13.00-18.00
Rosin, grade E	5.20-
Satin white	2.00- 2.25
Soda ash, 58 per cent light (bags)	1.50- 1.75
Sulphite of alumina, commercial grade	1.50- 1.60
Starch, papermakers', in bags	2.25- 2.35
Talc (ton)	10.00-12.00

Box Boards

Paper Board Specialties

TRADE MARK L X QUALITY SERVICE

Our diversified mill connections and control of productions enable us to quote promptly and ship from a mill most conveniently located.

You save time, freight charges and delay in your production because of the unexcelled La Boiteaux service.

Take advantage of it to your profit. Write us for samples and quotations.

The C. L. LaBoiteaux Co.

Cincinnati Cleveland Chicago New York

BATHURST LUMBER COMPANY, LIMITED

PRICE & PIERCE, LTD.

17 East 42nd Street, NEW YORK CITY

ARE NOW THE

SOLE SELLING AGENTS
for Bathurst Pulp

Unbleached Sulphite 50 tons daily
Kraft Pulp 50 tons daily

Our pulp is made from Canadian Spruce
We ship in sheets, baled

BATHURST, NEW BRUNSWICK, CANADA

Wax Paper Coating Machines

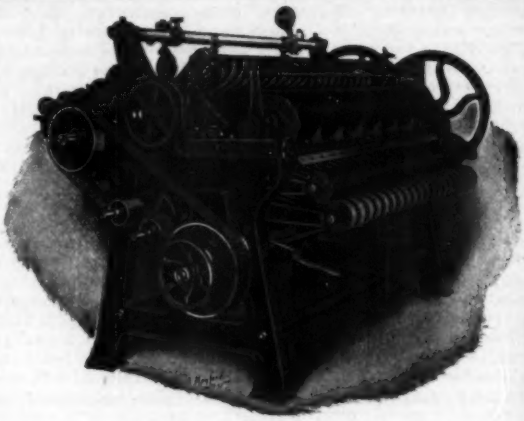
Carbon Paper Coating Machines
Gumming and Gluing Machines

Type 40-G. Semi and Full Wax Coating Machine.
Patented in United States. Also in Great Britain, Canada and Germany.

This machine will coat one or both sides of the paper with the exact amount of wax desired; with finest high gloss finish on self-sealing bread wrappers, also on both heavy or light papers; it can absorb the wax entirely into the paper or retain most on the outside; also high grade dry waxed paper, and best grades of waterproof and oiled papers up to 72 inches wide, at a fast rate of speed. For light tissue waxing, use our Type 45-C.

Write for particulars of machines in which you are interested. Submit your problems to our Engineering Dept. A.

MAYER COATING MACHINES CO.
Rochester, N. Y., U. S. A.
CABLE ADDRESS—CARMATIC

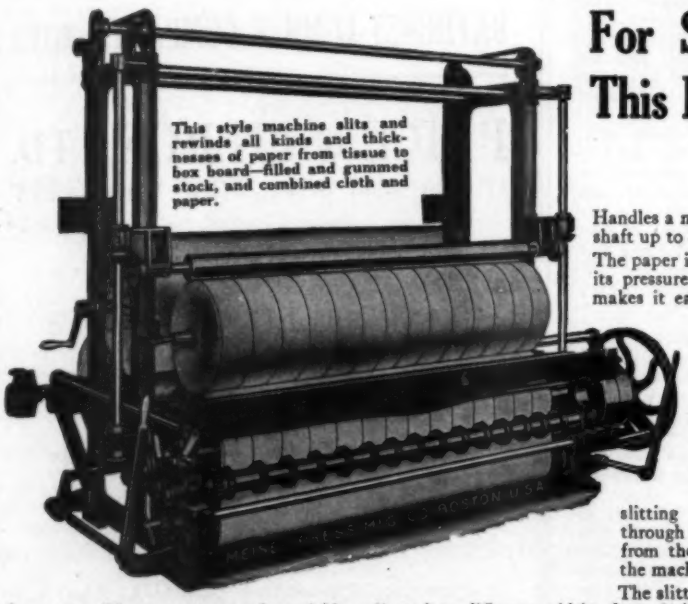


PAPER CUTTERS

Single, Duplex, and Diagonal

CUTTER KNIVES
PATENT TOP SLITTERS

Hamblet Machine Co.
LAWRENCE, MASS.



This style machine slits and rewinds all kinds and thicknesses of paper from tissue to box board—filled and gummed stock, and combined cloth and paper.

For Slitting and Rewinding This Is the BEST MACHINE Made

Handles a mill roll up to 40 inch diameter and rewinds on one shaft up to 40 inch in diameter.

The paper is rewound by the use of three rolls; the top roll by its pressure gives compactness to the rewound paper roll and makes it easy to handle the poorest grades of paper without breaking. That serious defect in some machines arising from a one-side drive for the top pressure roll is wholly overcome by our double drive which gives uniform bearing on the rewound roll. This top pressure roll is easily and quickly raised for changing the roll by turning a crank. Counterweights can be increased or decreased in weight according to requirements.

Another prominent feature of this machine is its convenience. It has a device for separating the slitting cutter shafts to facilitate threading the paper through the machine. All adjustments necessary are made from the operator's place which is at the rewinding end of the machine.

The slitting cutters which are on parallel shafts give a clean, shear cut. The cutters may be quickly adjusted to different widths from 1¼ inch upward, and are clamped to the shafts with ample bearing surface so that they always run perfectly true.

MEISEL PRESS MFG. CO.

944 Dorchester Ave. **BOSTON 25, MASS.**

New Papers

Writing—	
White rag	15-40
White sulphite, No. 1	10-20
Colored	12-40
Ledger—	
White rag	15-50
White sulphite	12-25
Colored sulphite	10.00
Colored rag	10-00
Bonds—	
White rag	13-40
White sulphite	9-20
Colored sulphite	10-25
Colored rag	14-40
Book—	
No. 1 S. & S. C.	6.00- 6.50
Machine finished	5.75- 6.25
English finished	5.75- 6.25
Coated and enameled	8.00-10.00
Lithograph, M. F.	9.00-11.00
Newsprint—	
Rolls, contract	3.50-
Rolls, transient	3.50-3.75
Sheets	4.00-4.25
Side runs	3.00-3.25
Cover Stock—	
Coated, both sides	9.25-
Coated, one side	9.20-
Tissue—	
No. 1 white, 20x30	.80- .90
No. 2 white, 24x36	.70- .80
No. 1 manila, 24x36	.70- .80
Kraft	1.00-1.25
Wrappings—	
No. 1 kraft	6.75-7.50
No. 2 kraft	5.75-6.50
Boards	New York and Chicago
Solid news	37.50-42.50
Straw	45.00-50.00
Plain chip	32.50-37.50
White coated chip	55.00-60.00
Manila coated chip	50.00-55.00
Binders' board	70.00-80.00

Special Committee Appointed to Study Waste

Waste in the paper industry will be made the subject of a highly intensive study by a special committee of the Technical Association of the Pulp and Paper Industry, as a result of the study made by the Federated Engineering Societies through what is known as the Hoover Committee.

Robert B. Wolf, the paper mill engineer who was a member of the original Hoover committee, will be chairman of the Technical Association's committee, with George D. Bearce, engineer of the News Print Service Bureau as vice-chairman.

The problem of waste in the paper industry was taken up by representatives of the Hoover committee with Dr. Hugh P. Baker, Executive Secretary of the American Paper and Pulp Association, and the Hoover committee's report discussed some general phases of the paper industry in its general report, particularly the waste in the printing, or consuming division of the paper industry. The engineering studies, however, have been taken up by the Technical Association, representing the engineers of the industry.

The phase of the problem to be studied is the loss of materials, or the lack of their proper utilization. The loss of material, whether fibre or chemicals, is largely through being carried away in the mill effluent and the bearing of the study on stream pollution should insure the broadest support not only of the paper companies concerned, but also the state and federal bodies. This support is being evidenced by the promise of active co-operation by the Forest Service and Forest Products Laboratory through Earle H. Clapp, Assistant Forester of the Washington staff. The study will start with the materials at the plants in their raw state, and will follow them through the mill to the finished product. Since wood is the chief raw material used, the largest place will undoubtedly be held by wood and wood pulp although others will be dealt with. The waste of wood as such may be defined as the decrease in value through deterioration during storage and its destruction by fire and decay on account of ineffective means of prevention.

In general, the studies will involve losses in bark removal, and the better utilization of bark, losses of coarse material in mill effluents, inefficient use of power, in the mechanical pulp mills and in preparation of wood. In sulphite mills the losses of sulphur through inefficient plant control, and of fibre in mill effluents, as well as utilization of spent liquors, will be studied. Loss of chemicals as well as of fibre will be the problem of the soda and sulphate mills.

In the paper mill proper, the chief avenue of waste of fibre and materials is through the mill effluent, and the loss of heat is a serious problem.

The ablest engineers in the industry will be selected for the committee, and the aid of the industry's executives is being invited as well.

In preparation for the pulp mill, waste may be due to inefficient methods of bark removal by which material designed for pulp is either disposed of as an elaborate waste or applied to a lower use, as for fuel. Waste would also include the disposal of bark otherwise than for fuel purposes, provided its value as fuel could be shown to be greater than the cost. There may also be the production of an unnecessary amount of sawdust or material unsuitable for pulp manufacture.

Probably the outstanding instances of waste is the coarse material removed in screening the pulp where it is not utilized but is otherwise disposed of, usually through the mill effluent, while another is the considerable percentage of usable pulp that is carried away by the same means through inefficient methods of fibre recovery.

Another waste of which little definite is known, is the undoubted loss of power through inefficient regulation of the factors involved.

In this class of chemical pulp mills, probably the oustanding sources of material waste are the losses of sulphur through inadequate plant control, and the loss of fibre in the mill effluent. A waste which has long been studied and which is still unsolved for the industry at large, is the spent liquors of digestion. The methods of digestion may be responsible for the production of an excessive quantity of screenings containing incompletely digested wood as well as the knots.

Apart from the fibre carried away, which is common to nearly all pulp and paper mills, the chief wastes probably lie in the unwarranted loss of chemicals due to the apparatus used and inefficient methods of recovery.

The chief avenue of waste both of fibre and chemicals is through the mill effluent. The waste of fuel may be either in the steam plant itself or in any of the mills to which the steam produced is distributed for process work or for heating. In chemical pulp mills the loss of heat is almost complete. In a sulphite mill the heat produced in burning sulphur is a definite amount compared with an equal weight of coal. In discharging the contents of digesters of chemical pulp mills some attempt has been made to recover the discharged heat. In the case of paper mills it is recognized that the application of heat in the drying operation is extremely wasteful and measures have been applied in a few cases towards heat recovery. One of the chief causes of the waste of heat, especially in the more northern sections of the country, is the poor insulation of the buildings.

The Clarage Fan Co., Kalamazoo, Mich., has issued its latest catalog, No. 52, illustrating and describing Clarage fan equipment for heating and ventilating. The Clarage Kalamazoo Multiblade Fans described in the publication are adaptable in both public buildings and industrial plants. A complete description and sufficient engineering data is given, by which one is able to select the proper fan apparatus for the particular installation. The Clarage Fan Co. maintains a thoroughly competent engineering department to co-operate and extend service on these problems.

Read What These Users Say

Gentlemen—We are pleased to report that the Automatic Knife Grinder you sent us is very satisfactory indeed, and we just feel like kicking ourselves for not having ordered one of these a long time ago.
You surely have a good Grinder, and at the least money that we know of.
Kalamazoo Vegetable Parchment Co.

Gentlemen—The 108" Type B Full Automatic Feed Knife Grinder purchased from you several months ago is giving us excellent service. We have no complaint to offer.
York Haven Paper Co.

Gentlemen—The 54" Type B Full Automatic Feed Knife Grinder purchased from you has given us good satisfaction.
Three Rivers Paper Co.

Gentlemen—I have been using one of your 130" Type B Full Automatic Feed Knife Grinders for some time, and I am glad to say that it is satisfactory in every way and that I would not be without it.
River Raisin Paper Co.

Originals of these and many other fine testimonials on file in our office.

SAMUEL C. ROGERS & CO.
No. 22 Lock St., Buffalo, N. Y.
"The Knife Grinder People"

Stickle Compound Condensing System
and Automatic Steam Control
for Paper Machines

As shown in the folder we sent out to the mills—"*How to Dry Paper*"—showing our Compound Condensing System for draining the dryers and heating the air with the discharge from the dryers to condition the machine room should interest you. We guarantee a saving of 20 per cent in steam consumed for this purpose.

Open Coil Heater & Purifier Company
Indianapolis Indiana
Boston Philadelphia

Manganese Bronze for Beater Bars and Bed Plates

Dill & Collins Company write

After several disastrous attempts with the first few sets of bars we installed, we finally arrived at a satisfactory conclusion after considerable experimenting. We installed a set of manganese bronze beater bars made by the American Manganese Bronze Company. These have been in continuous operation for about seven years and have just recently been given a thorough inspection. They showed no wear whatever except on the edge in contact with the bed plate.

We have estimated that manganese bronze bars will last fifteen years. The alum, filler, size and chemicals used in the stock in the beater, corrode and erode the iron bar on the side but this does not occur in the case of the bronze bar.

The manganese bronze bed plate was removed at the end of two and a half years for inspection and it was found necessary to chip away a little of the wood filling. Steel bars in the bed plates require chipping of the fillings once every six months.

AMERICAN MANGANESE BRONZE COMPANY
Holmesburg, Philadelphia, Pa.
Cleveland: 986 Leader News Bldg. Montreal: 285 Beaver Hall Hill Detroit: 7644 Woodward Ave. Pittsburgh: 906 House Bldg

Wood Pulp

Marked improvement has been recorded recently in the demand for foreign wood pulp and the market for this commodity has steadied to a very pronounced degree after having ruled uncertain and easy for quite a long period. Indications are that available supplies of pulp are still in excess of the present requirements of consumers in this country, and while demand has broadened sufficiently to make for a better price tone and for a healthier market condition, there must be a good deal more improvement effected in the movement of supplies toward consumption before prices are likely to advance.

Figures from official Government sources show conclusively that importations of wood pulp into the United States in recent months have been far above normal, which, in conjunction with a rather steady domestic production of good volume, has tended to weaken the market position of pulp. Taking the figures covering pulp importations for the five or six months up to and including March, 1922, an approximate average of monthly imports during that period amounted to around 100,000 tons, which, to say the least, is very much larger than was generally considered as normal in the days prior to the war, when about 35,000 tons was viewed as an average monthly supply of foreign pulp. It is logical to believe therefore that there are fairly large stocks of imported wood pulp in the United States still to be sold to consumers, and until the bulk of these supplies are removed it is quite probable that the market will be in a more or less uncertain condition. On the other hand, at the rate paper manufacturers are using pulp at present it should not require so much time for stocks to be well liquidated, even though domestic production is on a normal, or very close to normal, level. The situation consequently is promising, and the changed attitude of importers and others holding stocks of pulp recently can be taken as a reflection of the belief that better times are in store for the pulp trade.

Another strong factor in the wood pulp situation is that matters at primary sources are constantly growing more bullish. Production in Sweden and other European countries is said on good authority to be decreasing owing to labor difficulties and raw material conditions, and it is also stated that demand from European consuming sources is on the rise, thus removing potential supplies for the American market. Consumers in the United States, from all appearances, are not much concerned over these reports, and one can scarcely blame them for not being when the recent heavy importations are taken into consideration. But it should be remembered that wood pulp is a highly speculative commodity and that it would not require much action on the part of Scandinavian manufacturers and operators to effect a much stronger market condition under prevailing circumstances.

Quotations exhibit no important changes over those ruling a month ago. For a time there were numerous reports of sales in different corners of the trade at rather sharp concessions from the prices asked, but since demand from paper mills has broadened, prices have steadied until they are fairly well stabilized on comparatively firm levels. Bleached sulphite of No. 1 grade is quoted at 4 to 4.25 cents per pound ex dock at New York and other American Atlantic ports, while No. 1 unbleached is quoted at around 2.50 cents, easy bleaching at 2.75 to 3 cents, Mitscherlich unbleached sulphite at 2.90 cents, and Scandinavian kraft of No. 1 quality at around 2.65 cents.

Receipts at the port of New York in May and current market quotations follow:

Bleached sulphite, No. 1	$ 4.00-$ 4.25
Unbleached sulphite, No. 1	2.50- 2.65
Easy bleaching	2.75- 3.00
Mitscherlich unbleached	2.90- 3.00
Kraft	2.60- 2.75
Ground wool, per ton	35.00-

Castle, Gottheil & Overton, 325 bls. from Rotterdam and 1,410 bls. from Hamburg; Scandinavian-American Trading Co., 7,366 bls. from Gothenburg; Kelly & Co., 1,000 bls. from Gothenburg and 7,700 bls. from Liverpool, N. S.; Irving National Bank, 1,050 bls. from Helsingfors; Johaneson & Co., 762 bls. from Gothenburg; H. Hollesen, 4,294 bls. from Bremen; Lagerloef Trading Co., 1,894 bls. from Helsingfors; E. M. Sergeant & Co., 1,750 bls. from Helsingfors, 215 bls. from Christiania and 1,260 bls. from Gothenburg; Fred Enders & Co., 675 bls. from Hamburg; Perkins-Goodwin Co., 800 bls. from Christiania; J. Andersen & Co., 600 bls. from Christiania; M. Gottesman & Co., 580 bls. from Rotterdam and 4,000 bls. from Sebenico; Tidewater Paper Mills Co., 22,448 bls. from Liverpool, N. S.; Nilsen, Rantoul & Co., 600 bls. from Bremen; Seggerman Bros., 500 bls. from Gothenburg; W. H. Donaldson, 2 bls. from Gothenburg; Poland Paper Co., 6,450 bls. from Gothenburg; Order, 1,523 bls. from Hamburg.

Paper Stock

There has not been much of a gain, if any, in importations of papermaking material during the past month. Importers continue to complain of the narrow range for profit in paying the prices demanded by European merchants for rags, rope, baggings and similar goods and selling them to paper mills in the United States at the prices the latter are willing to grant, and it is noticeable that most of the supply now coming into the country is consigned to those import houses which contract with consumers for deliveries some time ahead so that it is probable the bulk of goods coming in is on old orders. Merchants in Europe are said to be insisting on receiving certain prices for their material and are generally satisfied to wait out the market here unless obtaining the minimum figures set by them, with the result that it would appear prices in the American market must necessarily advance a little before importations are likely to increase. Current arrivals of rags are considerably less than normal, and only occasional shipments of any consequence of old rope and bagging are coming into the country. Receipts through the port of New York in May follow:

Old Rope

Brown Bros. & Co., 214 coils and 138 bls. from Hull, 514 coils from Bristol, and 184 coils from Newcastle; First National Bank of Boston, 83 coils from Copenhagen, 103 bls. and 252 coils from Rotterdam and 112 coils and 57 bls. from Antwerp; J. Perlman, 9 bls. from Havana; Daniel M. Hicks, Inc., 209 coils from Hull; American Express Co., 17 bls. from Antwerp; Pollak Bros., 31 bls. from Coruna; American Exchange Bank, 78 coils from Glasgow, 100 coils from London and 93 coils from Leith; Irving National Bank, 78 coils from Christiania and 73 coils and 49 bls. from Copenhagen; Order 34 bls. from London, 23 bls. from Vancouver and 55 coils from Hamburg.

Old Bagging

Daniel M. Hicks, Inc., 510 bls. from Havre; E. J. Keller Co., 218 bls. from Havre; Edwin Butterworth & Co., 119 bls. from Antwerp; Castle, Gottheil & Overton, 54 bls. from Havre; Order, 117 bls. from Liverpool and 85 bls. from Hamburg.

Rags

E. J. Keller Co., 17 bls. from Rotterdam, 343 bls. from Hamburg, 8 bls. from Bordeaux and 651 bls. from Havre; Paul Berlowitz, 226 bls. from Rotterdam; Bankers Trust Co., 877 bls. from Hamburg; Salomon Bros. & Co., 218 bls. from Hamburg; Castle, Gottheil & Overton, 906 bls. from Havre, 297 bls. from Antwerp and 154 bls. from Rotterdam; A. Hurst & Co., 52 bls. from Antwerp; R. F. Downing & Co., 367 bls. from London and 105 bls. from Rotterdam; American Woodpulp Corp., 337 bls. from Hamburg; Parsons & Whittemore, 12 bls. from Hamburg; Coal & Iron National Bank of Philadelphia, 58 bls. from Hamburg; National City Bank, 62 bls. from Hamburg; Irving National Bank, 102 bls. from Buenos Aires and 18 bls. from Hamburg; Johnson & Faulkner, 30 bls. from Havre; F. P. Gaskell & Co., 54 bls. from Bremen and 57 bls. from Hamburg; J. M. Jaffe, 21 bls. from Bremen; Wilkinson Bros. & Co., 52 bls. from Bremen; Maurice O'Meara Co., 60 bls. from Hamburg; Rudolf Wolf, 56 bls. from Rotterdam; George W. Miller & Co., 2 bls. from Rotterdam; Goldman, Sachs & Co., 167 bls. from Hamburg; Order, 55 bls. from Calcutta, 5 bls. from Bordeaux, 33 bls. from Vancouver, 17 bls. from London, 73 bls. from Hamburg and 553 bls. from Liverpool.

Miscellaneous Paper Stock

Mechanics & Metals National Bank, 164 bls. from Marseilles; George W. Millar & Co., 643 bls. from Rotterdam; E.

Guaranteed Perfect

Draper Hollow Balanced Brass Balls

FOR STUFF PUMPS

Absolutely balanced; will not pound out of shape

Specify these when ordering new pumps.

Order these to replace worn-out balls.

We make a specialty of repairing stuff pump balls.

We also manufacture—

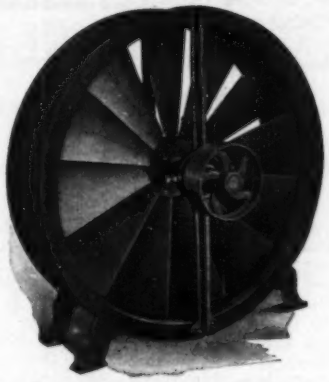
SOLID BRASS BALLS
IRON AND STEEL BALLS
BALL CHECK VALVES
VALVE FACING TOOLS

The Draper Manufacturing Co.

Port Huron, Mich. Petrolea, Canada

Every ball bears our registered trade-mark

Ventilating Fans



The Knowlton Multiblade Fans are the best that can be obtained for paper mill ventilating because they are exceedingly rugged—perfectly balanced and the air capacity is exceptionally large.

Sizes in Stock 32 inch, 40 inch, 48 inch
Any other size built to order
Either Belt or direct connected Motor Drive

WRITE FOR CIRCULAR

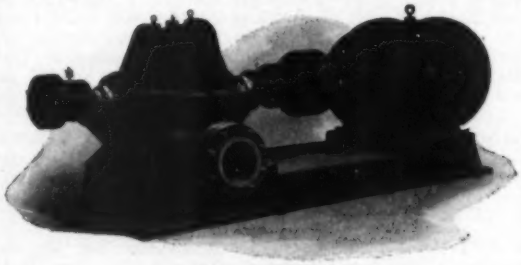
May we have your inquiries for Special Machinery —Iron Castings—Table and Wire Rolls—Cut Gears —etc., etc.

KNOWLTON MACHINE CO.

Established 1864

WESTBROOK MAINE

Aurora Centrifugal Pumps



Type OMD

Aurora pumps are made in many types, to meet all conditions found in the paper mill field.

We specialize in horizontally and vertically split open and inclosed impeller, single and multi-stage and deep well turbine centrifugal pumps as well as deep well reciprocating pumps.

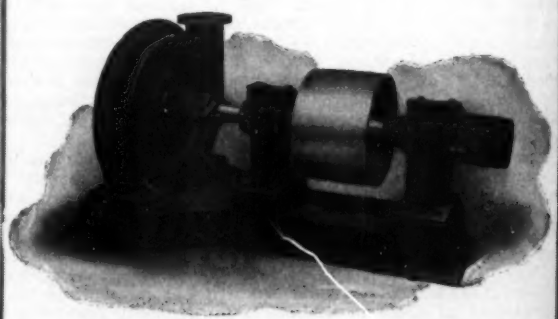
A card from you stating your conditions places our engineers at your service and results in a saving to you.

AURORA PUMP & MFG. CO.

Home Office and Factories, Aurora, Ill., U. S. A.

CENTRIFUGAL PUMPS

for



Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.

BERLIN, N. H.

J. Keller Co., 20 bls. from Glasgow, 17 bls. from Rotterdam and 39 bls. from Belfast; Ladenburg, Thalman & Co., 12 bls. from Hamburg and 21 bls. from Dundee; State Bank of New York, 26 bls. from Rotterdam; R. F. Downing & Co., 395 bls. from Rotterdam; Irving National Bank, 48 bls. from Hamburg; Guaranty Trust Co., 170 bls. from Antwerp; Order, 44 bls. from Antwerp.

Paper

With the possible exception of news print importations since the war, there has probably never been such a concerted movement of any kind of paper into the American market from European sources as marks the present imports of kraft wrapping paper from Sweden and Germany. Shipments of this character of paper to the United States during May reached alarming proportions, even exceeding in volume the arrivals of the same kind of paper in the several preceding months. Evidently the Swedes and Germans are using the United States as an outlet for their surplus output of wrapping paper or else paper concerns in this country are finding that they can import this kind of paper so much cheaper than they can buy it from domestic producers that they are obtaining a large part of their needed supply from across the Atlantic.

Imports of news print keep up at a moderately high level although Government figures show that less print paper is being imported from Europe than last year. Comparatively large amounts of cigarette, hanging and filter paper were imported during May. Arrivals at the port of New York in May follow:

Cigarette

American Tobacco Co., 1,968 cs. from Bordeaux and 283 cs. from Havre; R. J. Reynolds Tobacco Co., 850 cs. from Bordeaux; Ligget & Myers Tobacco Co., 7 cs. from Bordeaux; Rose & Frank Co., 114 cs. from Havre; Surbrug Co., 27 cs. from Havre; British-American Tobacco Co., 101 cs. from Liverpool; Phelps Bros. Co., 4 cs. from Trieste; P. J. Schweitzer, 106 cs. from Marseilles; Southern Pacific Co., 3 cs. from Havre; Order, 50 cs. from Marseilles and 10 cs. from Trieste.

Printing

F. G. Prager & Co., 14 cs. from Hamburg and 5 cs. from Antwerp; J. & J. Scott, 89 rolls from Hamburg; C. K. MacAlpine, 340 rolls from Gothenburg; American Woodpulp Corp., 454 rolls from Gothenburg; Chase National Bank, 1,493 rolls from Gothenburg; J. W. Banker, 112 rolls from Gothenburg; J. B. Harris & Co., 97 rolls from Bremen and 243 rolls from Helsingfors; H. Reeve Angel & Co., 137 rolls from Bremen; Bible & Trust Co., 88 rolls from Bremen; L. Schulman & Co., 604 rolls from Bremen; Irving National Bank, 457 rolls from Bremen and 83 rolls from Copenhagen; P. C. Zuhlke, 165 cs. from Antwerp; B. F. Drakenfeld & Co., 37 cs. from Liverpool; L. Glickman & Co., 212 rolls from Bremen; Whiting-Patterson Co., 185 bls. from Bremen; Agros Corp., 104 rolls from Helsingfors; Parsons & Whittemore, 11 rolls from Helsingfors and 1,048 rolls from Bremen; Paper House of Pennsylvania, 1,227 rolls from Hamburg; J. P. Hefferman Paper Co., 2 bls. from Copenhagen, Atlantic National Bank, 93 rolls from Copenhagen; Oxford University Press, 10 cs. from Liverpool; Kupfer Bros. Co., 17 cs. from Rotterdam; Virginia Paper Co., 212 rolls from Bremen; First Federal Foreign Banking Assn., 135 rolls from Hamburg; Chemical National Bank, 286 rolls from Hamburg; T. L. N. Smythe, 11 cs. from Hamburg; Borregaard Co., 585 rolls from Gothenburg; Order, 991 rolls from Hamburg, 3,814 rolls from Gothenburg, 8,131 rolls from Bremen, 174 rolls from Helsingfors and 316 rolls from Copenhagen.

Wrapping

Republic Bag & Paper Co., 510 rolls from Bremen and 6,209 rolls from Hamburg; D. S. Walton & Co., 271 rolls and 5,346 bls. from Gothenburg and 940 rolls from Hamburg; International Acceptance Bank, 96 rolls and 633 bls. from Bergen, 2,620 bls. from Trondhjem and 41 rolls from Gothenburg; E. C. Melby, 13 bls. from Bergen and 165 bls. from Copenhagen; Fernstrom Paper Co., 58 bls. from Bergen; Atlantic National Bank, 246 bls. from Hamburg, and 678 bls. and 990 rolls from Gothenburg; A. Bleyer & Co., 2,469 bls. from Bremen; J. B. Harris & Co., 53 bls. from Bremen; H. Reeve Angel & Co., 19 Rolls from Helsingfors; Ladenburg, Thalman & Co., 942 bls. and 719 rolls from Hamburg; Chase National Bank, 47 rolls from Copenhagen; Paper Mfg. Co., 65 bls. from Glasgow; Lasher & Lathrop, 72 bls. from Bremen; Birn & Wachenheim, 100 bls. from Bremen and 42 cs. from Havre; Kern Commercial Co., 352 rolls from Hamburg; Bernard, Judae & Co., 26 bls. from Hamburg; Brown Bros. & Co., 30 bls. from Hamburg; Import Paper Co., 5 cs. from Hamburg; Seggerman

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Bros., 203 rolls from Gothenburg; Pulp and Paper Trading Co., 990 rolls and 93 bls. from Gothenburg; Chemical National Bank, 263 bls. and 278 rolls from Gothenburg; O. H. Sawyer, 64 rolls from Gothenburg; Maurice O'Meara Co., 1,316 bls. from Gothenburg; Arkell Safety Bag Co., 631 rolls from Gothenburg; J. P. Hefferman Paper Co., 167 bls. from Gothenburg; Gilbert Paper Co., 1,160 rolls from Gothenburg; Wilkinson Bros. & Co., 13 bls. from Gothenburg and 417 rolls from Copenhagen; Cleveland-Akron Bag Co., 50 rolls from Gothenburg; C. G. Winans Co., 208 rolls from Gothenburg; Crowell Corp., 90 rolls from Gothenburg; M. M. Cohen, 189 rolls and 105 bls. from Gothenburg; Becker Paper Co., 99 rolls from Gothenburg; Blauvelt-Wiley Paper Mfg. Co., 78 rolls from Gothenburg; Whiting-Patterson Co., 10 bls. from Gothenburg; Charles F. Hubbs & Co., 35 bls. from Gothenburg; Steiner Paper Co., 30 cs. from Hamburg; Order, 942 bls. from Hamburg.

Hanging

A. C. Dodman, Jr., 4 bls. from Antwerp and 13 bls. from Liverpool; Cowtan Sons, Inc., 1 cse. from Southampton; R. F. Downing & Co., 31 cs. from Yokohama; F. G. Prager & Co., 1,985 rolls from Antwerp; Bernard, Judae & Co., 24 bls. from Hamburg; A. Murphy & Co., 50 bls. from Hamburg, 9 bls. from Liverpool and 3 cs. from Havre; W. H. S. Lloyd & Co., 5 bls. from Havre; W. H. Kinnear, 5 cs. from Kobe; R. Krause & Son, 3 cs. from Antwerp; J. L. Vandiver, 4 cs. from Havre; Order, 10 cs. from Antwerp and 10 bls. from London.

Writing

J. W. Hampton, Jr., & Co., 2 cs. from Bordeaux and 8 cs. from Hamburg; Irving National Bank, 23 cs. from Antwerp; L. Bamberger & Co., 7 cs. from Havre; French Worsted Co., 15 cs. from Antwerp; Order, 111 cs. from Marseilles.

Drawing

Leonhardt & Brush, 1 cse. from Hamburg; American Shipping Co., 11 cs. from Hamburg; Keuffel & Esser Co., 4 cs. from Havre, 2 cs. from Liverpool and 51 rolls and 11 cs. from Hamburg; Lunham & Moore, 10 cs. from Rotterdam; E. Dietzgen & Co., 6 cs. from Hamburg; Bernard, Judae & Co., 29 cs. from Hamburg.

Filter

E. Fougera & Co., 58 cs. from Southampton and 56 cs. from Bordeaux; Lunham & Moore, 9 cs. from Rotterdam; Leonhardt & Brush, 2 cs. from Hamburg; Orbis Products Trading Co., 60 bls. from Bordeaux; American Express Co., 22 bls. from Bordeaux; C. H. Danziger & Co., 5 cs. from Hamburg; Bernard, Judae & Co., 6 cs. from Gothenburg.

Tissue

American Express Co., 4 cs. from Havre; H. W. Robinson & Co., 3 cs. from Havre; Meadows, Wye & Co., 7 cs. from Liverpool; Order, 3 cs. from London.

Photo

T. F. Wilmot & Co., 3 cs. from London; Geavaert Co. of America, 2 cs. from Antwerp; J. J. Gavin & Co., 2 cs. from Liverpool; Hensel, Bruckmann & Lorbacher, 2 cs. from Hamburg.

Boards

F. G. Prager & Co., 139 cs. from Hamburg and 72 cs. from Bremen; Metropolitan Importing & Mfg. Co., 50 cs. from Hamburg; Hensel, Bruckmann & Lorbacher, 2 cs. from Hamburg; Globe Shipping Co., 1 cse. from Hamburg; Knauth, Nachod & Kuhne, 26 cs. from Bremen; Irving National Bank, 306 rolls from Antwerp; S. Feldman & Co., 9 cs. from Bremen; C. B. Richard & Co., 11 cs. from Bremen; P. F. Cabelt, 200 bls. from Rotterdam; Wiebush, Calendar Importing Co., 12 cs. from Hamburg; Feunis & Co., 7 cs. from Hamburg; Phoenix Shipping Co., 63 cs. from Hamburg; Redden & Martin, 5 cs. from Hamburg; Bendix Paper Co., 64 cs. from Hamburg; Bernard, Judae & Co., 3 cs. from Hamburg; Order, 8 cs. from Hamburg and 260 rolls from Antwerp.

Miscellaneous

J. W. Hampton, Jr., & Co., 63 cs. from Hamburg and 3 cs. from Havre; Guthmann, Salomon & Co., 3 cs. from Bremen; Berk Bros., 36 cs. from Hamburg; Phoenix Shipping Co., 8 cs. from Hamburg; Guaranty Trust Co., 94 cs. from Antwerp; Globe Shipping Co., 146 cs. from Rotterdam and 7 cs. from Havre; Litho Printing Co., 2 cs. from Rotterdam; International Forwarding Co., 25 cs. from Hamburg; Wagner Bros. & Co., 2 cs. from Havre; Wells Shipping Co., 30 cs. from Bremen; A. L. Diament & Co., 2 cs. from Havre; Bernard, Judae & Co., 14 cs. from Havre; Whiting-Patterson Co., 4 cs. from Havre; Kern Commercial Co., 93 cs. from Rotterdam; Borden-Riley Paper Co., 15 cs. from Antwerp; F. B. Vandegrift & Co., 5 cs. from Hamburg; Baldwin Shipping Co., 29 cs. from Hamburg; C. H. Boulin, 28 cs. from Marseilles.

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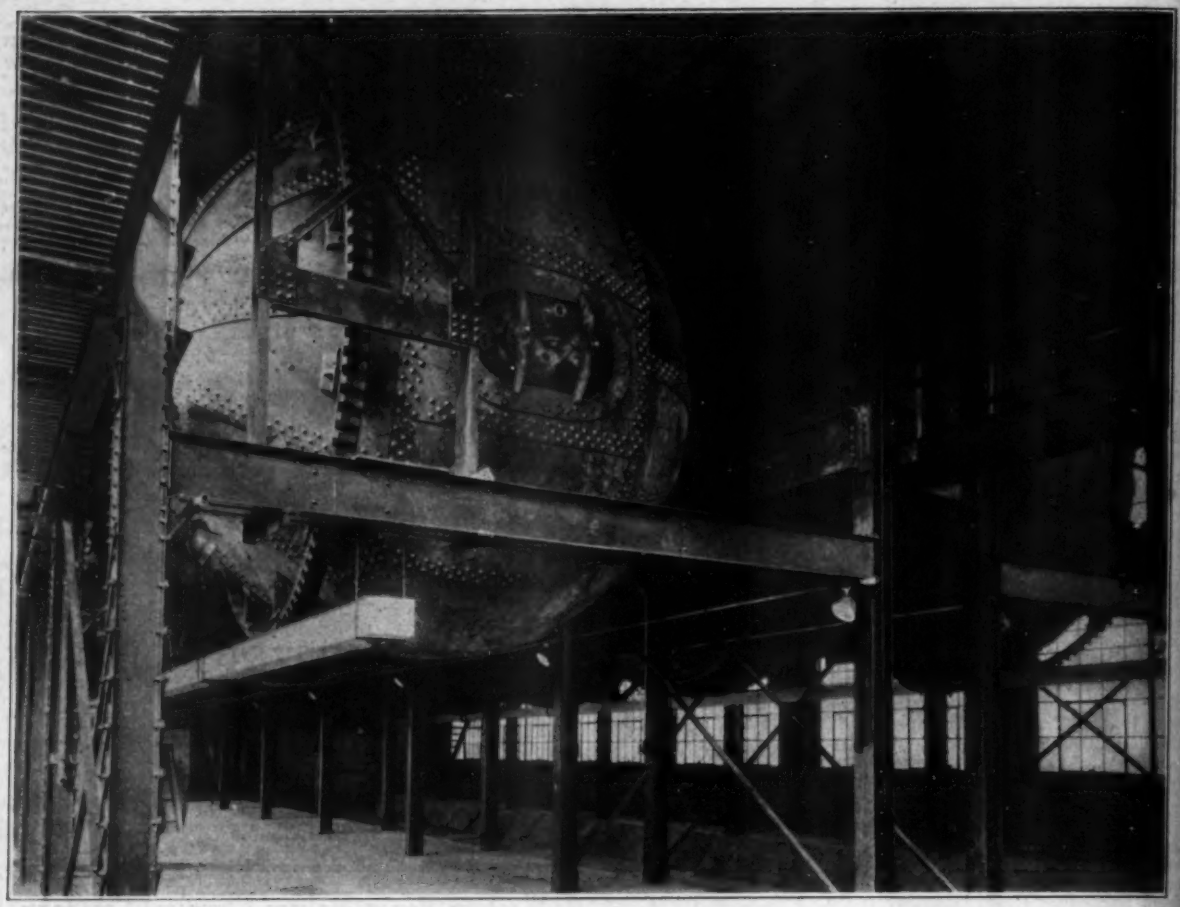

Biggs Rotary Bleaching Boilers

This picture shows twelve of our 14 foot diameter "Globes," recently installed in the new plant of the Hinde and Dauch Paper Company at Fort Madison, Iowa (described in the May issue of this magazine), making a total of eighteen Biggs Rotaries now in use at this plant.

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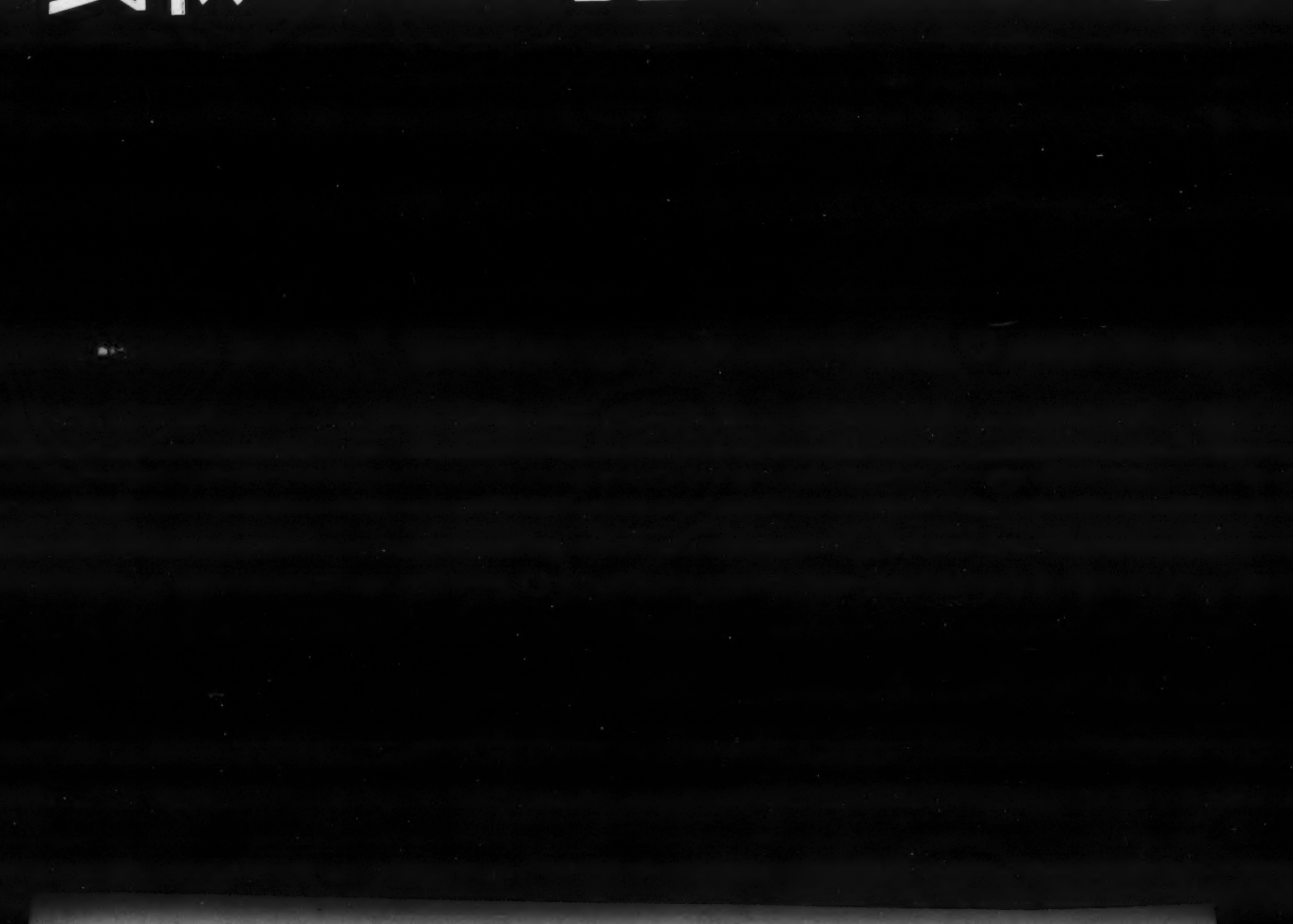
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